

# Plant Breeding Abstracts

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## \*STATISTICS

2590 RADHAKRISHNAN, T. V.

### A note on the technique of "ranking" in plant breeding.

Madras agric. J. 1954 : 41 : 57-59.

A brief explanation is given of the way in which Spearman's rank correlation coefficient can be used to determine (1) whether two judges agree significantly in their ranking of a series of varieties and (2) whether an individual judge is efficient when his ranking is compared with actual quantitative observations.

2591 WANG, C.-M.

### Notes on multi-varietal trials.

Taiwan Tahsueh Nungyuan Yenchiu Paokao/Mem. Coll. Agric. Taiwan Univ. 1950 : 2 : No. 3 : 1-31.

A discussion, illustrated by a numerical example, of the method of analysis of a simple lattice with recovery of interblock information is given.

## \*GENETICS

2592 JUCCI, C.

L'agrobiologia in Russia. Gli Istituti biologici dell'Accademia delle Scienze dell'URSS a Mosca e a Leningrado. (Agrobiology in Russia. The biological institutes of the USSR Academy of Sciences at Moscow and Leningrad). Genet. agr. 1954 : 4 : 161-63.

An account of the Academy of Sciences of the USSR and a number of its dependent institutes is given on the basis of a visit made in October 1953 by a group of Italian biologists which included the author. Special mention is made of work at the Timirjazev Institute on respiratory phenomena in cell-free extracts from silk worms; the use of trace elements in demonstrating the origin of vitamins as the direct products of photosynthesis and the absorption of CO<sub>2</sub> from the soil by plant roots; the production of potato varieties the leaves of which resist temperatures of -1 or -2° C; the adoption of certain new chemicals for favouring and for retarding growth; and Cicin's wide crosses, including *Triticum* x *Agropyron* hybrids which yield 45-70 q. per ha. of grain without lodging,

one of them being resistant to *Ustilago tritici* and all suitable for mechanized harvesting; the perennial hybrids, which yield grain for four successive crops, are, it is stated, still in the experimental stage.

2593 KUŠNER, H. F., FEĖGNSON, N. I. & PLJUŠČ, L. N.

### (The theory of vitality in Mičurinite biology).

Ž. obšč. Biol. (J. gen. Biol.), Moscow 1953 : 14 : 198-214. [Russian].

Lysenko's theories on inheritance and vigour (cf. †PBA, Vol. XXIII, Abst. 847) are expounded.

2594 WOOLF, B.

### Biometrical analysis in quantitative inheritance.

Heredity 1954 : 8 : p. 151.

It is shown that Mather's method of using second degree statistics to estimate the genetic and environmental components of variance (cf. PBA, Vol. XIX, p. 913) can be simplified so that each of the parameters required can be expressed as a linear function of the observations.

2595 COONEN, L. P.

### Lysenko in Athens.

Science 1954 : 119 : 694-95.

The author gives translations of passages from the writings of Aristotle, Theophrastus and Hippocrates which show some resemblance to the tenets of Lysenkoism, and expresses the view that whereas the ignorance of the ancient Greeks is excusable, the refusal by the Lysenkoists to take into account the findings of Mendelism can only be criticized.

2596 GOLDSCHMIDT, R. B.

### Different philosophies of genetics.

Science 1954 : 119 : 703-10.

The text of the presidential address to the Ninth International Congress of Genetics, held at Bellagio, Italy, in August 1953, is given. The author contrasts two alternative approaches in genetical research, referring to them as the statistical or static point of view of classical genetics, and the physiological or dynamic point of view. To illustrate his belief that the

\* General studies, see also individual crops.

† Plant Breeding Abstracts.



former approach leads to "hyperatomism and hyperselectionism" and that the functional approach is more constructive, he discusses the ways in which the same set of phenomena is interpreted according to the two points of view, giving as examples concepts of the structure and function of the gene and the chromosome, and some problems of the genetics of *Drosophila* and other animals, such as dosage effects in sex-linked mutants, sex determination and mimicry (cf. *PBA*, Vol. XXIII, Abst. 5).

2597 **The progress of science. Lysenko under fire.**

Discovery 1954 : 15 : 175-76.

A short account of recent Russian criticisms of Lysenko's biological theories, in particular his theory of interspecific conversion, is presented.

2598 ASHBY, E.

**The decline of Lysenko.**

Listener 1954 : 52 : 53-54.

In this review of recent criticisms of Lysenko emanating from the USSR, it is suggested that one of the major reasons for the change of official policy is the realization that agricultural production has not increased under Lysenko's guidance to the degree anticipated.

2599 ZIRKLE, C.

**The involuntary destruction of science in the USSR.**

Sci. Mon., NY 1953 : 76 : 277-83.

In this survey of the effects of governmental policy on science in the USSR, in which special reference is made to Soviet genetics, various explanations as to why western science has been criticized are reviewed. The author is of the opinion that the policy of encouraging scientists who have expressed appropriate Marxist views rather than those whose scientific attainments are undoubted has led to a deterioration in the quality of scientific work, and that this policy has continued for so long now that it has, to a large extent, got out of control. It is emphasized, however, that scientific shortcomings are slower to manifest themselves in such subjects as biology, agriculture and medicine than, say, in engineering.

2600 STERN, C.

**The geneticists' analysis of the material and the means of evolution.**

Sci. Mon., NY 1953 : 77 : 190-97.

A popular account of the mechanism of heredity is given, special emphasis being placed on mutations and their role in evolution, natural selection, recombination and genetic drift.

2601 SOBELS, F. H.

Het Negende Internationale Genetische Congress, gehouden te Bellaggio (Lago di Como) van 24-31 Augustus 1953).

[**The Ninth International Genetics Congress, held in Bellaggio (Lago di Como) 24-31 August 1953**].

Vakbl. Biol. 1954 : 34 : 61-69.

This brief account in Dutch of the proceedings of the above conference includes summaries of some papers of special interest.

2602 NUŽDIN, N. I.

**(The bankruptcy of Morganist pseudoscience).**

Ž. obšč. Biol. (J. gen. Biol.), Moscow 1953 : 14 : 71-81. [Russian].

The recently published genetical symposium edited by Dunn (cf. *PBA*, Vol. XXII, p. 624) is criticized from a Mičurinite viewpoint. Castle and Goldschmidt are criticized for rejecting the inheritance of acquired characters. Research on cytoplasmic and chromosomal structures by Muller, Beadle, Ephrussi, Sonneborn and Mirsky is mentioned as evidence of inheritance not being determined by genes or chromosomes. Müntzing's disappointment in practical breeding results obtained by polyploidy is noted. Huxley is criticized for regarding evolution as having reached a static stage and for borrowing from Darwin only erroneous ideas on the causes of variability, intraspecific competition and other Malthusian fallacies.

2603 Tramonti in Russia. Lysenko e le sue teorie. (**Sunsets in Russia. Lysenko and his theories**).

Ital. agric. 1954 : 91 : No. 4 : i-ii.

Reference is made to the demotion of Dmitriev (cf. *PBA*, Vol. XXIII, Abst. 1115) and the general decline of Lysenkoism in the USSR.

2604 DE HAAN, J. A. B.

Twee dwalingen op het gebied van de geschiedenis der evolutiegedachte. (**Two misconceptions in the field of the history of evolutionary thought**).

Vakbl. Biol. 1954 : 34 : 41-51.

The writer contests the popular belief that the dispute between Cuvier and Geoffrey St. Hilaire at the session of the Paris Academy of Sciences on 15 February, 1830 was concerned with evolution and that Cuvier's victory in this debate stifled progress in evolutionary thought until the appearance of Darwin's "Origin of Species." The debate did not touch upon pre-Darwinian theories on evolution, but dealt exclusively with comparative anatomy. Furthermore, many works on evolution appeared



between 1830 and 1859, including Chambers' "Vestiges of the Natural History of Creation" in 1844. An account of this work is given and its basic concept that evolution is due to a combination of environmental conditions and an innate capacity for improvement in each living being is held to be an intermediate stage between Lamarck's and Darwin's theories.

2605 SIRKS, M. J.

Dwaling of verschil in standpunt? Een korte repliek. (**Misconception, or difference in point of view? A short reply**).

Vakbl. Biol. 1954 : 34 : 69-70.

It is claimed that B. de Haan (cf. Abst. 2604) has paid too much attention to the natural philosophical aspect of evolution and not enough to the scientific. It is true that the meeting of the Paris Academy of Sciences dealt with problems concerning metamorphosis and the theory of prototypes. However, in his attacks on St. Hilaire, Cuvier, the great opponent of Lamarck's theories, was striving to demolish the theory of evolution. His victory in the debate proved a major factor in discouraging progress in evolutionary thought prior to Darwin.

2606 LEWIS, D.

**Serological reactions of pollen incompatibility substances.**

Proc. roy. Soc. 1952 : Ser. B : 140 : 127-35.

The results of serological tests on pollen of *Oenothera organensis* showed that S alleles produce specific antigenic substances. No evidence was obtained that the complementary stylar substance involved in the incompatibility reaction is the result of antigenic stimulus by the pollen tubes. Inhibition of pollen-tube growth in the style was complete and irreversible at 31° C in 30 min. and after 0.2 to 0.3 mm. of growth.

2607 BROWN, S. W. & CAVE, M. S.

**The detection and nature of dominant lethals in *Lilium*. I. Effects of X rays on the heritable component and functional ability of the pollen grain. II. Cytological abnormalities in ovules after pollen irradiation.**

Amer. J. Bot. 1954 : 41 : 455-83.

Irradiation of the pollen of *L. formosanum* with doses of 4000 r. induced dominant lethality in almost 100% of the grains but did not appreciably affect the functional ability of the pollen.

Cytological abnormalities in ovules resulting from fertilization by gametes from irradiated pollen consisted chiefly of large, irregularly lobed nuclei and micronuclei from fragmented chromosomes. Some nuclei were polyploid, others probably polytene. Few bridges were observed in either the zygote or endosperm, suggesting that the chromosome ends had healed before illegitimate unions could occur. All the nuclei degenerated after approximately 40 days. Mechanical difficulties in mitosis are regarded as the chief immediate cause of the abnormalities; genetic unbalance and the toxic effects of irradiation may be responsible to a lesser degree.

2608 SÁNCHEZ-MONGE, E.

El tamaño de las poblaciones en la mejora de plantas. (**Population size in plant breeding**).

An Estac. exp. Aula Dei 1954 : 3 : 233-46.

A formula is presented for calculating the number of plants ( $N$ ) that would be required in a given generation in order that one plant should be dominant for all of  $r$  genes; tables are given showing the value of  $N$  for  $F_2$  to  $F_{10}$  with values of  $r$  from 1 to 100, and for  $P$  values of 10%, 1% and 0.1%. Other sets of calculations show (a) the number of plants required when the genes are distributed among a number of different parent forms; (b) the number for back crosses, and (c) the numbers required in working with cross-fertilized plants.

2609 KIMURA, M.

**The recombination of chromosome segments through continued self-fertilization.**

Cytologia, Tokyo 1953 : 18 : 93-104.

Considering the case of a single initial heterozygous chromosome pair, the frequency  $H_n$  of heterozygous chromosomes after  $n$  generations of selfing, given that the chromosome length is  $100x_0$ , will be

$$H_n = \int_0^{x_0} f(\xi) d\xi + (1 - x_0)^{2n/2^n}.$$

Tables of  $H_n$  for the first 20 generations and curves of  $H_n$  for 1-14 chromosome pairs are given.

Formulae are also given for the frequency distribution of the parental chromosome types after fixation and for the distribution of recombination segments of various lengths. The number of effective factors, assuming that neither dominance nor epistasis is present and that only single crossing-over occurs, will be  $1/(1 - \frac{2}{3}x_0)$ .



- 2610 HARTE, C.  
Die Verteilung der Endchiasmen auf Ring- und Bivalentchromosomen bei *Oenothera albicans.stringens*. (**The distribution of terminal chiasmata in chromosomes with a ring and bivalent chromosomes in *Oe. albicans.stringens***).

Chromosoma 1954 : 6 : 301-13.

The distribution of terminal chiasmata was studied in two *Oenothera* hybrids of the constitution *albicans.stringens*. Fewer terminal chiasmata were found in the ring of twelve than in the bivalent. Chiasmata formation in the ring of twelve followed the same pattern as in a ring of four (cf. *PBA*, Vol. XX, Abst. 769).

- 2611 BENNETT, J. H.  
**Panmixia with tetrasomic and hexasomic inheritance.**

Genetics 1954 : 39 : 150-58.

"Random mating with linked factors is considered in a population of organisms which exhibit tetrasomic or hexasomic inheritance. Tables are presented giving gene-combination frequencies in the gametic output in terms of the recombination fraction for a pair of linked loci. Recurrence relations are established for these frequencies and solved quite generally."

[Author's summary]

- 2612 KOSEC, N. I.  
(**Has the possibility of direct conversions of hornbeam into hazel and pine into spruce been proved?**)  
Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 696-707. [Russian].

It is stated that explanations of the phenomena referred to in *PBA*, Vol. XXIII, Absts. 1501 and 1506 based on Lysenko's recent conversion theory are not supported by direct evidence. It is thought that the hazel branch borne on a hornbeam tree and spruce branches found on a pine have originated as a result of natural intergeneric grafting.

- 2613 DILLEMAN, G.  
L'hybridation interspécifique naturelle. (**Natural interspecific hybridization**).  
Bull. Soc. bot. Fr. 1954 : 101 : 36-87.

This comprehensive review of interspecific hybridization includes (1) a definition of the term hybrid; (2) an account of natural conditions necessary for the spontaneous crossing of two species and the role played by man in changing normal ecological conditions and thus facilitating hybridization; (3) a description of genetical and physiological factors and geographical barriers

restricting hybridization; (4) an explanation of the mechanism of selective fertilization and of the effect of pollen mixtures in preventing or favouring pollination by a different species; (5) an account of the fertility, chances of survival and habitat of the hybrid; (6) the role played by hybridization in evolution and (7) questions of nomenclature and taxonomy.

- 2614 SRB, A. & WADDINGTON, C. H.  
**"Role of plasmagenes".**

Nature 1954 : 173 : 685-86.

Srb criticizes some points made by Waddington in his review of "Nucleo-cytoplasmic relations in micro-organisms" by B. Ephrussi (cf. *PBA*, Vol. XXIII, p. 656), on the grounds that Waddington misinterpreted a number of Ephrussi's statements dealing with the genetic continuity of plasmagenes and with the role of the plasmagenes and cytoplasm in differentiation. Waddington replies to these criticisms, emphasizing his general view that a more empirical approach to the plasmagene theory is desirable.

- 2615 MICHAELIS, P.  
Der Nachweis einer Plasmavererbung beim Weidenröschen (*Epilobium*). [**The proof of cytoplasmic inheritance in the willow herb (*Epilobium*)**].  
Umschau 1953 : 53 : 266-70.

The results of crosses conducted at the Max-Planck Institute for Breeding Research, Voldagsen, Germany, between different strains of *Epilobium* are used to illustrate the mechanism of cytoplasmic inheritance (cf. *PBA*, Vol. XXIII, Abst. 161).

- 2616 PREER, J. F. (JUN.) & STARK, P.  
**Cytological observations on the cytoplasmic factor "kappa" in *Paramecium aurelia*.**

Exp. Cell Res. 1953 : 2 : 478-91.

In studies of the cytoplasmic factor  $\kappa$  in several stocks of *P. aurelia* at the University of Pennsylvania, the proportion of forms with refractile regions was found to increase in direct relation to diminishing food supply.

- 2617 HANSON, E. D.  
**Studies on kappa-like particles in sensitives of *Paramecium aurelia*, Variety 4.**

Genetics 1954 : 39 : 229-39.

A new type of sensitive, dependent upon the gene *K* and cytoplasmic particles termed  $\pi$ , arose from a killer culture; the particles are believed to be mutant  $\kappa$  particles.



- 2618 FISHER, R.  
**Croonian lecture. Population genetics.**  
 Proc. roy. Soc. 1953 : Ser. B : 141 : 510-23.

The view is expressed that the discipline of population genetics *senso strictu* can only be applied to natural populations which are not human artefacts as the result of selective improvement. The subject of population genetics proper is discussed with reference to the theoretical background, virus genetics, the technique of capture-sampling and the Rhesus blood groups.

- 2619 KJØRVEN, C.  
 Radioaktive isotoper i planteforedlingens tjeneste. (**Radioactive isotopes in the service of plant breeding**).  
 Norsk. Landbr. 1954 : 20 : 192-93.

A talk by K. Mikaelsen of the Institute for Genetics and Plant Breeding at the Norwegian Agricultural College, on the use of radioactive isotopes to induce mutations in economic plants, is recorded. Irradiation of the barley *Domen* has produced plants that are 14 days earlier than the parent variety. Last year mutants were obtained in cereals, clover and tomatoes. This year a cobalt isotope, which gives an even source of irradiation during the whole growth period, will be used.

- 2620 CARDINALI, G.  
**Mutagenic activity of ethylenimine picrate.**  
 Nature, Lond. 1954 : 173 : 825-26.

Ethylenimine picrate was found to have a mutagenic effect upon *Drosophila*, and also an inhibitory effect on aerobic glycolysis in neoplastic tissues, comparable to that shown by bifunctional nitrogen mustards. The importance of the ethylenimine ring in the mechanism of action of nitrogen mustards and ethylenimine compounds was therefore confirmed, but these results give no support to the cross-linkage hypothesis of Goldacre *et al.* (cf. *PBA*, Vol. XIX, Abst. 2354).

- 2621 CROSBY, J. L.  
**A suggestion concerning the inheritance of "acquired characteristics."**  
 Heredity 1954 : 8 : p. 152.

"The view is put forward that there might sometimes be a selective advantage in a mechanism which allows an adaptive response to unusual environmental conditions to be carried over in a hereditary manner to the succeeding generation. A possible mechanism, in accord with orthodox genetical knowledge

and theory, is suggested; it would, however, be limited to certain kinds of adaptive response."  
 [Author's summary]

- 2622 SCHWANITZ, F. & HAHN, H.  
 Genetisch-entwicklungsphysiologische Untersuchungen an Galmepflanzen. I. Pflanzengrösse und Resistenz gegen Zinksulfat bei *Viola lutea* Hudson, *Alsine verna* L. und *Silene inflata* Sm. (**Genetical investigations of the developmental physiology of plants characteristic of soils containing zinc. I. Plant size and resistance to zinc sulphate in *V. lutea* Hudson, *A. verna* L. and *S. inflata* Sm.**).  
 Z. Bot. 1954 : 42 : 179-90.

Investigations conducted at the Experimental Institute, Niedermersberg, Westphalia, showed that strains of the above plants growing on soils with a high zinc content had adapted themselves to these conditions by a process of natural selection and could tolerate doses of zinc sulphate that had a lethal affect on plants from normal soils. A strain of *S. inflata* adapted to soils with a high copper content was also examined. Populations possessing resistance to concentrations of zinc or copper in the soil had a smaller habit and smaller cells than plants growing under normal conditions; no correlation existed between tolerance of zinc and tolerance of copper soils.

## EVOLUTION

- 2623 GILMOUR, J. S. L. & HESLOP-HARRISON, J.  
**The deme terminology and the units of micro-evolutionary change.**  
 Genetica 1954 : 27 : 147-61.

The authors present a synopsis of the terminology of the deme categories proposed as a system of classifying microevolutionary units (cf. Abst. 2639).

- 2624 SIMPSON, G. G.  
**The Baldwin effect.**  
 Evolution 1953 : 7 : 110-17.

The concept of the Baldwin effect is examined with reference to its definition, the conflicts between the neo-Darwinian and neo-Lamarckian points of view, supposed examples and its status in modern evolutionary thought. As an alternative to neo-Lamarckism, the concept supposes that accommodation or acquired adaptation is paralleled by genetic changes with similar results; the author points out that if these two main processes are not causally related accommodation is irrelevant to true genetic change; if they are so related then the effect can equally



well be regarded as supporting the neo-Lamarckian view as supplanting it. Following Schmalhausen's interpretation, it is suggested that the Baldwin effect may be considered as a special case of adaptive modification, which would occur if selection for the ability to acquire an adaptive character so restricted the developmental range that the character would usually or invariably occur.

2625 WADDINGTON, C. H.

**The "Baldwin effect," "genetic assimilation" and "homeostasis."**

Evolution 1953 : 7 : 386-87.

The writer criticizes Simpson for his analysis of the Baldwin effect on the grounds that he does not deal adequately with the relationship between nonhereditary adaptations and the occurrence of genes producing effects similar to these adaptations (cf. Abst. 2624). Waddington refers to his own theory of genetic assimilation as offering a more satisfactory approach (cf. Abst. 784). He comments on the use of "homeostasis," preferring "canalization" or "buffering" as being less static in implication (cf. Abst. 7). He further suggests that "canalizing selection" is better than "stabilizing selection" as a term denoting the process of establishing buffered developmental systems under the influence of natural selection.

2626 DOBROHVALOV, V.

**(Biological species and evolution).**

Nov. Mir [New World], Moscow 1953 : No. 10 : 200-13. [Russian].

Miçurinite theories on evolution (cf. *PBA*, Vol. XXI, Abst. 2500 and Vol. XXIII, Abst. 33) are outlined and discussed in the light of articles referred to in *PBA*, Vol. XXIII, Absts. 1634 and 1635 and Vol. XXIV, Absts. 41-50 and 52. It is concluded that the new facts, presented by Lysenko, on the evolution of some plants are important in promoting the study of evolution, but that the Miçurinite claim to have developed a new theory capable of supplanting classical Darwinism is premature. Those participating in the written discussion are asked to check their facts carefully in order to avoid errors such as that referred to in Abst. 46.

2627 BARANOV, P. A.

**(Species and evolution).**

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 688-95. [Russian].

Lysenko's theory of the evolution of species by conversion is said to conflict with the Miçurinite concepts of the unity of the organism with

its environment and of the environment having a decisive effect upon evolutionary processes. Moreover, it implies a rejection of selection and the idea of past evolutionary history influencing the inheritance and evolution of new forms. The value of reports on conversions is questioned, because these are based on evidence obtained in field experiments conducted under primitive conditions without strict scientific controls. The premature publicity given to unproven hypotheses, which have been presented as established theories, and the manner in which some supporters of Lysenko have conducted the discussion is deplored. A re-examination of the Miçurinite attitude towards the study of polyploidy, which is stated to have been erroneously associated by Lysenko with Mendelian-Morganist genetics, is advocated.

2628 VETKASOV, V. K.

**Questions relating to intraspecific relations between forest plants and to the term "bio-geocoenosis".**

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 714-17. [Russian].

Sukačev's concept of biogeocoenosis, founded upon Darwinian principles of competition, is accepted. Observations on forest trees conflict with Lysenko's recent theories that intraspecific competition does not occur.

2629 KOZO-POLJANSKIĖ, B. M.

**(Questions relating to the new concept of species).**

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 830-45. [Russian].

Lysenko's theory of evolution, which is compared with Köllicker's *Theorie der heterogenen Zeugung* [*Theory of heterogeneous creation*], is criticized on the grounds that (1) the published reports on conversions provide no detailed scientific data, (2) the concept of the mechanics of conversions is vague and (3) the new theory conflicts with the established Darwinian and Miçurinite principles of evolution. It is thought that the phenomena that Lysenko regards as instances of conversion may be explained in several other more acceptable ways.

2630 LAVRENKO, E. M.

**(Studying the evolutionary process under natural conditions).**

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 846-52. [Russian].

Botanical data, conflicting with Lysenko's evolutionary theory, notably his rejection of interspecific hybridization and development of intermediate forms as an evolutionary force,



are presented. Methods of promoting the study of evolution in nature, on the basis of the above principle, are outlined.

2631 PETROV, D. F.

(Question of the origin of species).

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 853-61. [Russian].

Lysenko's new concept of evolution is regarded as a malformed, unsubstantiated and unconvincing hypothesis. Such phenomena as the formation of a few rye grains in the ears of wheat may be accounted for by invoking androgenesis rather than the new principle of conversion. The Darwinian theory of the origin of species may be improved and extended by incorporating all modern data on the evolution of new species. In this connexion the breeding of new forms of plants by Mičurin and Cicin is mentioned.

2632 SUKAČEV, V. N. [Editor].

(To readers of the *Botaničeskii Žurnal*).

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 893-901. [Russian].

An apology is offered to Lysenko for inaccurate rendering of the title of his paper *New ideas in the science of biological species\**, listed as a reference in *Botaničeskii Žurnal*, 1953, No. 4, p. 555. Lysenko's charge that it had been altered intentionally to *A new theory of biological species†* is denied. The discussion in the journal had been based on the major points contained in Lysenko's articles *New ideas in the science of biological species*, *Sel'hozgiz*, 1952 and *Vid [Species]* published in the *Large Soviet Encyclopedia*. Most contributors to the discussion in the pages of *Botaničeskii Žurnal*, but also in other journals, for instance, *Žurnal Obščei Biologii [Journal of General Biology]* and *Zemledelie [Agriculture]* understood Lysenko's pronouncements as representing a new concept of species and evolution. The discussion has shown that many botanists reject the new concept of species.

2633 SUKAČEV, V. N.

(Intraspecific competition and biogeocoenology. Some remarks on the articles by N. I. Nuždin and V. S. Dmitriev).

Ž. obšč. Biol. (J. gen. Biol.), Moscow 1953 : 14 : 320-26. [Russian].

Mičurinite dicta on the absence of competition

and mutual help between individuals of the same species are rejected. Nuždin and Dmitriev, who have criticized Ivanov for so-called Malthusian errors (cf. Abst. 2634), are stated to have failed so far to give scientific evidence in support of Lysenko's evolutionary hypotheses, which are still under discussion in Soviet journals. Lysenko's description of the writer's biogeocenological studies as metaphysics and similar observations by Dmitriev are rejected as unscientific.

2634 NUŽDIN, N. I.

(Relapse into Weismannism disguised as a defence of Darwinism).

Ž. obšč. Biol. (J. gen. Biol.), Moscow 1953 : 14 : 3-22. [Russian].

KARAPETJAN, S. K.

(Some new ideas in the science of biological species—a creative development of Darwinism).

Ibid. 1953 : 14 : 229-37. [Russian].

NOVINSKIĬ, I. I.

(Against a defence of Weismannism).

Ibid. 1953 : 14 : 238-46. [Russian].

RUBAŠEVSKIĬ, A. A.

(Against an idealist revision of Mičurinite materialist biology).

Ibid. 1953 : 14 : 394-411. [Russian].

The arguments of Turbin and Ivanov against the theory of evolution by conversion of some species into others (cf. *PBA*, Vol. XXIII, Absts. 1634 and 1635) are rejected in favour of Lysenko's theory (cf. *PBA*, Vol. XXI, Abst. 2500).

2635 SEMENOVA-TJAN-ŠANSKAJA, A. M.

(Restoration of vegetation on uncultivated steppe-land in relation to the question of evolution by conversion).

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 862-73. [Russian].

A Mičurinite claim that successive changes occurring in plant societies on reclaimed land are caused by conversions of some species into others is rejected.

2636 HALDANE, J. B. S.

The origins of life.

New Biol. 1954 : No. 16 : 12-27.

Various theories on the origin of life are reviewed. The author favours the possibility that metastable organic compounds were first formed by the action of solar radiation in an atmosphere

\* Novoe v nauke o biologičeskom vide.

† Novoe v učenii o biologičeskom vide.



containing little free oxygen, and that catalytically active molecules, probably containing phosphate groups and able to act on the above compounds, were also produced. The most critical event in the evolution of life, however, is thought to have been the enclosure of several self-reproducing systems within a semipermeable membrane.

2637 BERNAL, J. D.

**The origin of life.**

New Biol. 1954 : No. 16 : 28-40.

Recent geochemical work that may throw light on the origin of life is considered. How molecules became assembled into a sufficiently high concentration for linked chemical reactions is regarded as one of the most difficult problems, the author favouring the theory of adsorption on clay. A further transition that is difficult to envisage is that between the preorganismal stage of linked biochemical reactions and the organism proper.

2638 PIRIE, N. W.

**On making and recognizing life.**

New Biol. 1954 : No. 16 : 41-53.

In this discussion on the origin of life, the author criticizes too facile an acceptance of theories on what environmental conditions were like when life first arose. He also points out that there is no logical basis for assuming that the biochemical processes most commonly encountered to-day were also equally important when life first arose; it is possible that unusual metabolic activities, such as the utilization of vanadium by the tunicates, were once more widespread.

2639 PRINGLE, J. W. S.

**The evolution of living matter.**

New Biol. 1954 : No. 16 : 54-67.

A theory of the origin of life is propounded, which envisages a progressive building up of chain reactions between molecules dissolved in the primitive sea. It is suggested that the reacting particles may have aggregated by the generation of stationary wave patterns of concentration, such as Turing has shown to be possible theoretically in certain types of dynamic chemical reaction systems.

2640 GREGOR, J. W. & WATSON, P. J.

**Some observations and reflexions concerning the patterns of intra-specific differentiations.**

New Phytol. 1954 : 53 : 291-300.

The authors make use of the results of their

investigations on the variability of English and Scottish populations of wild and agricultural types of *Lolium perenne* to illustrate the practical difficulties of applying the concept of ecotype as defined by Turesson. Genecological classification is briefly surveyed; the conclusion is reached that a number of classificatory terms, preferably with a common suffix such as the term *deme* proposed by Gilmour and Gregor, is likely to provide a sufficiently flexible means of coping with the different categories of genecological information on a given population.

## \*CYTOLOGY

2641 BRADLEY, M. V.

**Cell and nuclear size in relation to polysomaty and the nuclear cycle.**

Amer. J. Bot. 1954 : 41 : 398-402.

The areas of prophase, telophase and energic cells and nuclei were determined in well-flattened squash preparations of pith of *Nicotiana tomentosa*, mitoses having been induced by stem wounding. Under the conditions of the experiment, area was roughly proportional to volume. No  $2n$  cells were observed, the data being obtained from  $4n$ ,  $8n$ , and  $16n$  cells. A correlation of the sizes of energic cells and nuclei with those of telophase and prophase cells and nuclei was obtained; determination of the approximate percentages of energic cells at different levels of polyploidy is therefore possible. Chromatid number was more significant than chromosome number in relation to cell and nuclear "volumes." In the case of prophase nuclei, the increase in volume was apparently greater than two-fold for the step from  $4n$  to  $8n$  and considerably greater than two-fold for the change from  $8n$  to  $16n$ . At the telophase and energic stages, the increase in nuclear volume was approximately two-fold with successive rises in chromosome number. Cell volume at each of the three nuclear stages investigated increased by a factor of approximately 3 with each doubling of the chromosomes.

2642 CHAYEN, J., DAVIES, H. G. & MILES, U. J.  
**Observations on some plant interphase nuclei.**

Proc. roy. Soc. 1953 : Ser. B : 141 : 190-99.

In fixed root-tip cells of *Vicia faba* examined in squash preparations and in sections, the interphase nucleus exhibited the following regions: (1) a peripheral zone in which the chromosomes

\* General studies, see also individual crops.



lay, (2) a middle zone containing the nucleoli and (3) the nucleoli themselves, each consisting of an inner core of protein material surrounded by an outer region probably containing nucleoprotein. The nucleolar organizer was connected to zone (1) by a fine chromosomal thread. The size of zone (2) apparently increased with the mitotic activity in the root, as the result, it is suggested, of hydration of the protein. Fixed nuclei of root-tip cells of *Allium cepa* and *Zea mays* and also the nuclei of living staminal hairs of *Tradescantia* showed a similar zonation at interphase to that found in *Vicia*.

2643 LIMA-DE-FARIA, A.

**Chromosome gradient and chromosome field in *Agapanthus*.**

Chromosoma 1954 : 6 : 330-70.

Investigations on *A. umbellatus* showed that at mid-prophase II two gradients were present, one in chromomere size and the other in stainability of the fibrillae. At pachytene, in addition to these two gradients, a gradient in the thickness of the fibrillae was detectable. A gradient in the stainability of the fibrillae was also observed at prophase of mitosis. The term gradient refers to the gradual decrease shown by these three properties in the region extending from the side of the centromere to the corresponding end of the chromosome. The chromomere number of chromosome or arm varied from stage to stage of nuclear division, a linear relationship existing between arm length and chromomere number. Similar gradients have been found in other plants, e.g. rye, maize, tomato, *Fritillaria* and *Passiflora*. The term chromosome field denotes the mode of variation within the gradients, this being characterized by the following features: (1) the origin of the gradients is primarily related to the centromere; (2) the rate of decrease in the properties of the constituents of the gradients bears a definite relation to arm length; (3) knobs and their adjacent regions also affect the gradients; (4) recurrent seriations in chromomere size and stainability of the fibrillae locally disturb the gradients for these properties; and (5) the distance at which the chromomeres are spaced along a given chromosome is of similar magnitude at the different stages. It is suggested that many cytological and genetical phenomena, e.g. position effects, chiasmata distribution, the telomere concept, nondisjunction of certain types of B chromosomes or the distribution of pseudochiasmata, could be better understood by approaching them in terms of the chromosome field. Suggesting that his findings provide an

initial interpretation of the mechanism responsible for the behaviour of the chromosome as a functional unit, the author points out that this interpretation is not incompatible with the corpuscular theory of the gene.

2644 SHARMA, A. K. & MOOKERJEE, A.

**Possibilities of use of hormones in chromosome analysis.**

Caryologia 1954 : 6 : 52-62.

Experiments on the use of  $\beta$ -naphthoxyacetic, 1-naphthylacetic, phenylacetic and indolylacetic acids and of indolylpropionic and indolylbutyric acids as fixatives in caryotype analysis are described. Root tips were treated with hormone solution at 10-14°C, usually for 3 hours; the root tips were heated in a 2% solution of a 9 : 1 mixture of aceto-orcin and hydrochloric acid and then smeared in 1% acetoorcin. The material tested included *Allium cepa*, *Lathyrus*, *Cicer* and *Pisum*. At certain concentrations, the hormones destroyed the spindle mechanism and affected the cytoplasmic viscosity so as to cause differential contraction of the chromosome segments; metaphase chromosomes could be thus studied in detail. The possible nature of the cytological action of the hormones is discussed.

2645 TANDLER, C. J.

**An argéntaffin component of the nucleolus.**

J. Histochem. Cytochem. 1954 : 2 : 165-66.

A nucleolar component capable of reducing ammoniacal  $\text{AgNO}_3$  has been detected by applying the following technique to cells of root tips and animal tissues: frozen sections fixed in alcohol or formalin are washed in distilled water and immersed in ammoniacal  $\text{AgNO}_3$  for 12-24 hours in darkness at 35°C; after being washed in distilled water in the dark, the sections are treated with 5% acetic acid, washed again, dehydrated in alcohol and mounted in Euparal.

2646 GODWARD, M. B. E.

**The 'diffuse' centromere or polycentric chromosomes in *Spirogyra*.**

Ann. Bot., Lond. 1954 : 18 : 143-56.

As an explanation of the parallel separation of the chromatids in *Spirogyra*, *Luzula* and other organisms, polycentry is regarded as being more satisfactory than the alternative hypothesis of the diffuse centromere. Cytological observations on *Spirogyra* spp. suggest that the localized centromere evolved in a polycentric chromosome,



through the predominating influence of one centromere.

- 2647 BEATTY, A. V. & BEATTY, J. W.  
**Immediate effects of 200 r and 400 r of X-radiation on the microspores of *Tradescantia paludosa*.**  
 Amer. J. Bot. 1954 : 41 : 242-50.

Investigations were carried out on the immediate effects of X irradiation upon the development and first division of *Tradescantia* microspores at 30° C. After both the doses used, viz. 400 r. and 200 r. applied at the rate of 50 r. per min., a point occurred in midprophase at which the effect of the X rays was separated into two different types, chromosomes irradiated in the earlier part of midprophase reverting to an earlier stage, those irradiated in the latter part of midprophase showing clumping at metaphase and anaphase.

- 2648 DE MOL, W. E.  
 Die Teilungshypothese. (Division hypothesis).  
 Cellule 1954 : 56 : 149-78.

A general account of the methods by which genetic changes may be induced by chemical and physical agents is given. The existence of two types of genes, the elementary and the complex, is postulated; the elementary gene is the smallest irreducible factor capable of influencing the constitution of the organism whereas the complex gene consists of two or more genes functioning as a single entity. It is suggested that hereditary changes are caused by disturbances in the division process. If this disturbance affects the whole cell, it gives rise to what is termed a "modification"; if only the idioplasmic part of the cell is affected, a change takes place in the number of genes present and a mutation results. Multiple-allelomorphic and polymeric effects caused by single and complex genes are discussed, with special reference to the tulip and the hyacinth.

- 2649 GLUŠČENKO, G. I.  
**(Cell division by sulcation in the petiole of fig plants).**  
 Ž. obšč. Biol. (J. gen. Biol.) Moscow 1953 : 14 : 313-19. [Russian].

An amitotic method of cell division in which a groove forms at the cell wall and cuts the cell in two is described in the petioles of *Ficus* leaves; it intensified as the leaves matured. The nuclei of the cells reproducing by this means divided by gemmation. Normal mitosis was observed in cells adjacent to those dividing by sulcation.

- 2650 ROWLANDS, D. G.  
**Control of mitotic activity.**  
 Nature, Lond. 1954 : 173 : 828-29.

Using *Vicia faba*, *V. sativa* and *Lens esculenta*, the differentiated egg and central fusion nuclei and also the vegetative nucleus of the mature pollen grain were found to contain no deoxyribonucleic acid (DNA), as shown by the Feulgen technique. The generative nucleus of the pollen grain, however, contained DNA. It is therefore suggested that the division of the fertilized egg and central fusion nuclei is initiated by the reintroduction of DNA by the ♂ nuclei. The postulated role of DNA synthesis as a mechanism regulating nuclear activity is briefly discussed with reference to androgenesis and the problem of apomixis; some evidence has been obtained that the egg nucleus in apomictic forms of *Rubus* contains DNA (cf. *PBA*, Vol. X, Abst. 969).

- 2651 BOWEN, C. C. & WILSON, G. B.  
**A comparison of the effects of several antimitotic agents.**  
 J. Hered. 1954 : 45 : 3-9.

Investigations were carried out on the cytological effects of treating roots of pea seedlings with colchicine, actidione, streptomycin and chloromycetin. In contrast to colchicine-treated seedlings the material exposed to the effects of the antibiotics provided no evidence of spindle impairment except with concentrations causing non-recovery. Spindle derangements produced by drugs other than true polyploidizing agents may therefore be early stages in necrotic degeneration. Actidione and streptomycin inhibited mitosis at the prophase and preprophase stages; they also caused reversion of prophase to interphase. With chloromycetin, the least toxic of the antibiotics, distinction between cytological effects and necrotic processes was almost impossible. The authors advocate the restriction of the term c-mitosis to true polyploidizing agents whose action is characterized by (1) a highly specific reaction, (2) little or no effect upon prophase and (3) marked polyploidization.

- 2652 TRUHAUT, R. & DEYSSON, G.  
 Étude comparative des effets exercés sur les mitoses des cellules végétales par la méthyl bis- ( $\beta$ -chloréthyl) amine et son N-oxyde. (Comparative study of the effects exercised on the mitosis of plant cells by methyl bis- ( $\beta$ -chloroethyl) amine and its N-oxide).  
 CR Acad. Sci., Paris 1954 : 238 : 1605-07.  
 In experiments on the root-tip cells of *Allium*



*cepa* and other plants, the amine was found to be more poisonous than the N-oxide. Only the N-oxide proved capable of exercising a mitoclastic action prior to the death of the cells treated.

2653 MORITZ, O. & HELDT, L.

Beitrag zur Frage des Wirkungsbereiches des Colchicins in Pflanzenzellen. (Contribution to the question of the range of efficacy of colchicine in plant cells).

Ber. dtsch. bot. Ges. 1954 : 67 : 160-76.

The chemicals p-amino benzoic acid, p-oxybenzoic acid and sulphanilamide, all of which are thought to be analogous to growth substances produced by the growing plant, counteracted the effects of colchicine in experiments on *Allium cepa*, *Digitalis ambigua* and *Papaver somniferum* at the Pharmaceutical Institute of the University of Kiel, Germany. Small concentrations of colchicine, well below the level required to produce a mitoclastic effect, were found to stimulate seedling growth.

2654 IJIMA, M.

Changes of the intracellular reducing intensity in the pollen mother cells during meiosis of the young *Lilium* anthers.

Cytologia, Tokyo 1953 : 18 : 113-21.

Changes in the staining reactions of the nucleus and cytoplasm revealed that the reducing power of the sporogenous and tapetal cells increased considerably with onset of meiosis.

2655 DEMI, L.

Sulla natura germinale delle cellule ghiandolari presentanti fenomeni meiotici alla base del canale stilare nei generi *Viburnum*, *Sambucus* e *Adoxa* (Caprifoliaceae). [On the germinal nature of the glandular cells displaying meiotic phenomena at the base of the stylar canal in the genera *Viburnum*, *Sambucus* and *Adoxa* (Caprifoliaceae)].

Caryologia 1953 : 5 : 378-403.

Observations of the development of the female gametophyte have shown that in *V. tinus* one normal ovule develops in each locule; other ovules atrophy after having produced up to 18 nuclei. The same phenomenon in *S. nigra* leads to the formation of the meiotic areas in the stylar tissue which have been erroneously referred to by some authors as meioses in somatic tissue, and it is probable that the same is true in *Adoxa*.

2656 HOFFMAN, A.

Untersuchungen über interstitielle Chiasmen bei *Oenothera*. (Investigations of interstitial chiasmata in *Oenothera*).

Chromosoma 1954 : 6 : 277-300.

Meiotic studies of *Oe. hookeri*, *Oe. franciscana*, *Oe. grandiflora*, *Oe. lamarkiana* and crosses between these species and with *Oe. suaveolens* var. *sulfurea* showed that terminalization of the chiasmata is not concluded until metaphase and that interstitial and terminal chiasmata are less frequent in metaphase than in diakinesis. Homozygous forms of *Oenothera* displayed more terminal and interstitial chiasmata than did heterozygous forms. A positive correlation existed between the number of matrix bridges observed and the number of interstitial chiasmata.

2657 NEWCOMBER, E. H.

Observations on dosage, the mechanism of action and the recovery of cells exposed to ultrasonic vibrations.

Amer. J. Bot. 1954 : 41 : 384-89.

Root tips of *Narcissus* were exposed to ultrasonic vibrations at an intensity of 13 watts/cm.<sup>2</sup> No evidence was obtained that chromosomes or chromatids broken by the treatment underwent recombination or restitution; a condition of nuclear and cellular stasis was apparently produced, precluding further progress in the nuclear cycle. An intensity of 0.7 watt/cm.<sup>2</sup> for 5 seconds constituted the lowest effective dosage in inducing breaks. Reasons are given for concluding that intracellular cavitation is not responsible for the chromosomal changes produced by high-frequency sound waves.

2658 DE SERRES, F. J. & GILES, N. H.

The effect of radiation dose fractionation on chromosome aberration frequencies in *Tradescantia* microspores. I. Studies with X-rays.

Radiation Res. 1954 : 1 : No. 1 : p. 129. (Abst.).

Fractionation experiments at high intensity of radiation under controlled conditions of temperature and light, and at low intensity under uncontrolled environmental conditions, provided no evidence of a significant increase in aberration frequencies with intervals of 4-12 hours between the fractions as the result of a recovery in sensitivity to breakage, as reported by Lane (cf. *PBA*, Vol. XXI, Abst. 2352 and Vol. XXIII, p. 658).



- 2659 STEFFENSEN, D. & ARNASON, T. J.  
**Frequency of chromosome aberrations produced by fractional doses of X-rays in *Tradescantia*.**

Genetics 1954 : 39 : 220-28.

Irradiation of microspores with a "continuous" dose of 360 r. resulted in a consistently higher frequency of centric reunions than exposure to two doses of 180 r. separated by 4, 8, 12 or 24 hours. The so-called continuous dose consisted of two fractions of 180 r. separated by an interval of 1 or 2 minutes. In the fractional dose series, increase in interval did not lead to differences in frequency of reunion. The frequency of one-hit chromosome breaks appeared to be independent of the effects of dose fractionation. These results confirm the findings of Sax, Catchside and other investigators, but not those of Lane, who postulated a period of recovery in sensitivity to breakage with 4-12-hour intervals (cf. *PBA*, Vol. XXI, Abst. 2352 and Vol. XXIII, p. 658). The authors' results also confirm the view that in *Tradescantia* chromosome breaks undergo restitution or reunion soon after their production, and that restituted breaks rarely, if ever, reopen.

- 2660 KURABAYASHI, M.

**Effects of post temperature treatments upon the X-ray induced chromosomal aberrations.**

Cytologia, Tokyo 1953 : 18 : 253-65.

In experiments on young ovular tissue of *Paris tetraphylla*, a postirradiation temperature of 0° C caused (1) delay in the mitotic cycle and thus delay in the appearance of chromosomal aberrations compared with a temperature of 20° C, (2) a greater frequency of total chromosomal aberrations than 20° C, and (3) a pronounced increase in the frequency of translocations.

- 2661 FABERGÉ, A. C.

**Chromosome breakage by X-rays at very low temperatures.**

Radiation Res. 1954 : 1 : No. 1 : p. 130. (Abst.).

To induce the same number of breaks at +25° C and -192° C, *Tradescantia* pollen at the latter temperature has to be exposed to twice the X-ray dose used at the higher temperature. In reducing the frequency of isochromatid breaks, freezing to -192° C and a N atmosphere during irradiation at +25° C had approximately equal effects, which were additive under combined conditions. It is therefore concluded that the radiochemical processes involved in the effects of very low temperature and the absence of oxygen are distinct.

- 2662 WOLFF, S.

**Delay of chromosome rejoining in *Vicia faba* induced by irradiation.**

Nature, Lond. 1954 : 173 : 501-02.

Fractionation of the X-ray dosage administered to seeds soaked in water causes no decrease in the number of two-hit chromosomal aberrations, but additional presoaking in the proactivet agent 2,3-dimercapto-propanol (BAL) results in a decrease (cf. Abst. 1615). In dosage-intensity experiments, the number of two-hit aberrations showed a reduction only when the dose was applied over a longer period than 2 hours, in the case of seeds soaked only in water. It is assumed that no rejoining of broken ends occurred within 2 hours of the onset of radiation. Presoaking in BAL for 1 hr., however, caused a significant decrease in the number of aberrations as the intensity decreased. Treatment with BAL had evidently reduced the lag period. This effect of BAL, a powerful antioxidant, strengthens the hypothesis that anoxia chiefly affects restitution rather than initial breakage.

- 2663 GILES, N. H., DE SERRES, F. J. & BEATTY, A. V.

**The effect of radiation-dose fractionation on chromosome aberration frequencies in *Tradescantia* microspores. II. Studies with fast neutrons.**

Radiation Res. 1954 : 1 : No. 1 : p. 131. (Abst.).

A single dose of 25 N was administered without fractionation, and in two equal fractions with intervals of 1, 2, 4, 8 and 12 hours. No effect of fractionation was detected, the frequencies of interchanges and interstitial deletions being essentially the same for all treatments. This result is in marked contrast to the pronounced decrease in aberration frequencies resulting from fractionated doses of X rays (cf. Abst. 2657).

- 2664 FROLIK, E. F.

**Genetic effects of thermal neutron irradiation in plants.**

Conf. Isotopes Pl. Anim. Res. 1952.  
Rep. Kans. agric. Exp. Sta. 1953 : 81-87.

Investigations on the effects of thermal-neutron irradiation of maize pollen and seeds of maize and barley, carried out at the Nebraska Agricultural Experiment Station by the author and his colleagues R. S. Caldecott, R. Morris *et al.*, are surveyed. The several published reports referred to have already been summarized in *Plant Breeding Abstracts*.



- 2665 HARRISON, B. J. & McLEISH, J.  
**Abnormalities of stored seed.**  
 Nature, Lond. 1954 : 173 : 593-94.

Detailed studies were carried out on the cytological effects of storing seeds of onion and lettuce for five years in unsealed air, sealed air and sealed CO<sub>2</sub> at room temperature. Observations on lettuce showed that breakage was of the chromosome type, occurring in the early resting stage. The lettuce varieties generally exhibited a sharp increase in chromosome abnormalities at high germination values and a corresponding rise in mitotic activity. In the onion, however, the incidence of breakage was low at all levels of germination. In continued experiments on the lettuce, the gross rearrangements were not transmitted to the next generation, although small viable rearrangements may have been perpetuated. Storage in sealed air and carbon dioxide to some extent counteracted the effects of age upon percentage germination and production of chromosomal irregularities; it is concluded that gaseous exchange plays a large part in the metabolic processes of the resting seed.

- 2666 GORI, C.  
 Attività citologica di estratti acquosi di semi di *Reseda odorata* L. e di *Vicia Faba* L. (**Cytological activity of aqueous extracts of seeds of *R. odorata* L. and *V. Faba*.**)  
 Caryologia 1953 : 5 : 371-77.

Aqueous extracts of the seeds of both species when applied to onion roots had a toxic effect similar to that exerted by certain chemicals referred to as preprophase poisons (cf. *PBA*, Vol. XXI, Abst. 87); the extracts from older seeds had a stronger effect than those from fresh seeds, especially in *R. odorata*. C-mitoses were also observed.

- 2667 D'AMATO, F. & AVANZI, S.  
 Quarto contributo alla conoscenza dell'attività mutagena dei derivati dell'acridina (LII-LVIII). [**Fourth contribution to the knowledge of the mutagenic activity of acridine derivatives (LII-LVIII).**]  
 Caryologia 1954 : 6 : 77-89.

A study of the effect of seven further compounds (cf. *PBA*, Vol. XXIII, Abst. 1627) showed that all the acridine derivatives are preprophase inhibitors; most of them induce stickiness to a greater or lesser extent but this is not correlated with their capacity to produce chromosome breakage. Only a few of the compounds produce

marked c-mitotic effects. Owing to the relative slowness of their action, acridine derivatives produce fewer rearrangements than are induced by irradiation treatments. The greater effectiveness of noratebrine than that of atebrine affords a further example of parallelism between mutagenic and bactericidal activity (cf. Abst. 75).

- 2668 MACFARLANE, E. W. E.  
**Cytological conditions in root tip meristems after gross antagonism of phenylmercuric poisoning.**  
 Exp. Cell Res. 1953 : 2 : 375-85.

At the Institutum Divi Thomae, Cincinnati, Ohio, abnormalities in mitosis were observed in root tips of *Allium cepa* after treatment with PMOH. The addition of yeast extract, glutathione or cysteine partially counteracted the effect of phenylmercuric poisoning.

- 2669 TANAKA, R.  
**(On differences in cell volume between natural and artificial polyploids).**  
 Idengaku Zasshi/Jap. J. Genet. 1953  
 28 : 110-15. [Japanese].

An analysis of published data on the length of the stomatal guard cells shows that the stomatal dimensions of natural polyploids are consistently less than those of artificial polyploids, both in the case of autopolyploids and allopolyploids.

- 2670 LIUTI, A.  
 La colchicina ed i mutamenti biologici delle piante. (**Colchicine and biological mutants in plants.**)  
 Ital. agric. 1954 : 91 : 266-68.

An explanation is given of the colchicine technique and reference is made to polyploid grapes produced in the USA.

- 2671 ÖSTERGREN, G.  
**Polyploids and aneuploids of *Crepis capillaris* produced by treatment with nitrous oxide.**  
 Genetica 1954 : 27 : 54-64.

In experiments at the Institute of Genetics, University of Lund, Sweden, plants of *C. capillaris* were treated with nitrous oxide at a pressure of 10 atmospheres for 4-6 hours, at the time of the first or second zygotic division. Out of 199 plants, constituting the progeny of 4 treated plants, 15 were polyploids or aneuploids. It is suggested that the induction of polyploids by N<sub>2</sub>O treatment may have a number of advantages over the use of colchicine.



2672 WADA, B.

**Effect of chemicals on mitosis studied in *Tradescantia* cells *in vivo*. III. 2-amino-1.3-diazazulene, a chromosome doubling agent.**

Cytologia, Tokyo 1953 : 18 : 266-76.

In investigations on the staminal hairs of *Tradescantia*, disintegration of the atractoplasm was caused by a 0.5 mg. per c.c. solution of the above tropolone compound, nuclei with a doubled chromosome number or binucleate cells being produced. Nuclei at prophase reverted to the resting stage; the *de novo* occurrence of mitosis was entirely suppressed. It is concluded that whereas colchicine acts only upon the atractoplasm, 2-amino-1.3-diazazulene affects not only the atractoplasm but also the nucleoproteins in prophase nuclei. The action of 2-amino-1.3-diazazulene is discussed in terms of the author's hypothesis of the molecular structure of the atractoplasm (cf. *PBA*, Vol. XXI, Abst. 2343).

2673 RAMANUJAM, S. & PARTHASARATHY, N.  
**Autopolyploidy. A review.**

Indian J. Genet. 1953 : 13 : 53-82.

Literature on autopolyploidy is surveyed with reference to the following aspects: methods of induction by chemical and other means; evolutionary role of autopolyploidy; morphological effects; differential response to doubling of chromosome number shown by varieties and strains within a species; cell size; reaction of cytoplasm to autopolyploidy; the physiological properties of growth rate, enzyme content, photoperiodic response and ecological preferences; genetics; seed sterility; and use of autopolyploids in breeding.

2674 WEXELSEN, H.

Planteafordling ved hjælp av kromosomfordobling. (**Plant breeding with the aid of polyploidy**).

Samvirke 1954 : 49 : 145-47.

The use of induced polyploidy to the plant breeder is explained with examples of the results obtained with clovers, rye and turnips. Observations in Norway have shown that, though bumble bees visit both common and polyploid clover without preference, bees prefer the common clover.

In Norwegian experiments, high yielding, polyploid families of red clover have been bred; some are resistant to clover rot.

The inferior seed production found in some

polyploids, e.g. red clover, can be improved by selection.

2675 WARDEN, J. W.

Principales fórmulas y métodos de técnica citológica del Instituto de Genética de Lund, Suecia. (**Main formulae and methods of cytological technique at the Genetical Institute at Lund, Sweden**).

Rev. argent. Agron. 1954 : 21 : 33-42.

A Spanish translation of the instruction sheet at the course of cytology given at Lund by A. Levan is presented.

2676 MCINTOSH, D. L.

**A Feulgen-carminic technic for staining fungus chromosomes.**

Stain Tech. 1954 : 29 : 29-31.

Clear differentiation of the chromosomes of *Pyronema confluens* was obtained by staining the apothecia by the Feulgen method and then squashing and mounting in propiono-carminic. Snail-stomach cytase was used as an aid in flattening the asci.

## \*BOTANY

2677 ROHMEDER, M.

Ein zweckmässiges Bestäubungsgerät. (**A practical pollination apparatus**). Z. Forstgen. Forstpflanzenz. 1954 : 3 : 54-55.

Different methods of artificial pollination are surveyed and a new apparatus devised by the Forestry Experiment Station, Munich, is described. It consists of a rubber bulb, glass cylinder and nozzle; a current of air containing the pollen grains is directed on to the stigma. It is claimed that this method is extremely economical when the quantity of pollen available is limited.

2678 PREZENT, I. I.

(**With reference to the article of E. Tschermak**).

Agrobiologija (Agrobiology) 1953 : No. 5 : 121-23. [Russian].

It is pointed out that the results described by E. Tschermak-Seysenegg in the article referred to (cf. *PBA*, Vol. XIX, Abst. 1616) are more in consonance with Mičurinism than with the laws of Mendelism which Tschermak rediscovered and in the article in question attempts, it is stated, to "salvage." Reference is made to rye plants which the present author emasculated and left in a room devoid of rye pollen; they

\* General studies, see also individual crops.



still produced grain with the diploid chromosome number,  $2n = 14$ .

2679 HESLOP-HARRISON, J.

**Genecology and orthodox taxonomy : some theoretical aspects.**

Sci. Progr. 1954 : 42 : 484-94.

Views expressed during the last decade on the relationships between biosystematy and orthodox taxonomy in the botanical and zoological fields are surveyed and clarified.

**DISEASES, INJURIES, BACTERIA,  
FUNGI, VIRUSES**

2680 DEAN, A. C. R. & HINSHELWOOD, C.

**Colony formation by *Bact. lactis aerogenes* on solid media containing antibacterial agents.**

Proc. roy. Soc. 1952 : Ser. B : 140 : 339-52.

The statistical variation in the number of colonies developing on solid agar media containing antibacterial substances is greater for different cultures than for samples of a given culture. The behaviour of a single culture depends, however, upon the aeration and precise conditions of the test. The variances showed no apparent relationship with the ease of production of resistant colonies to a particular drug nor did the scatter of the survival times in liquid media differ markedly according to the ease with which resistant forms were produced. It is concluded that the fluctuation test for the demonstration of drug-resistant mutations must be applied with considerable reserve (cf. *PBA*, Vol. XXIII, Abst. 110).

2681 EDDY, A. A. & HINSHELWOOD, C.

**Death rate of populations of *Bact. lactis aerogenes*. I. Active adjustment of cells to adverse environments.**

Proc. roy. Soc. 1953 : Ser. B : 141 : 118-26.

Survival-time curves were determined for cultures exposed to various concentrations of 2 : 8-diaminoacridine, m-cresol or acid. Usually a small residue of the population exhibited a much greater apparent resistance to the lethal agent than the bulk. Selection and subculture of the survivors indicated that they were neither mutants with heritable resistance nor stably adapted cells. It was concluded that temporary cell adjustments were responsible for survival, since the proportion of longer-living cells was greater the longer the time scale of the experiment and also when glucose and oxygen were

present in the medium to support active metabolic changes.

2682 EDDY, A. A.

**Death rate of populations of *Bact. lactis aerogenes*. II. Environmental and other factors influencing the form of the survival curve.**

Proc. roy. Soc. 1953 : Ser. B : 141 : 126-37.

Experiments were carried out on the influence of the following factors upon survival in populations subjected to the action of lethal agents (cf. Abst. 2681); glucose concentration in the growth medium, serial subculture, age of parent culture and drug-induced morphological variation. Neither low permeability nor cooperative productive effects between different cells appeared to be a general cause of delayed lethal action.

2683 EDDY, A. A.

**Death rate of populations of *Bact. lactis aerogenes*. III. Interpretation of survival curves.**

Proc. roy. Soc. 1953 : Ser. B : 141 : 137-45.

Most theories interpreting survival curves in bacteria postulate either a progressive action of the lethal agent on cells with large inherent differences in resistance or random events such as encounters between the agent and a sensitive region of the cell. Analysis of experimental data obtained by the author and Hinshelwood (cf. Absts. 2681-2), together with a survey of the relevant literature, suggests, however, that the form of the survival curve depends essentially on the speed of the destruction of fundamental cell activities in relation to the probability of a random combination of various independent circumstances. The form of the curve is modified by (1) the occurrence, under favourable conditions, of adaptive adjustments, and (2) intrinsic intercellular differences. The latter are not, however, regarded as a major cause of variation in survival times. The element of chance in survival accounts for the frequent occurrence of extremely skew distributions of survival times.

2684 JOHNSON, R. B. & MAYS, C. G.

**A strain of *Shigella dysenteriae* 1 requiring proline.**

J. Bact. 1954 : 67 : 542-44.

A spontaneous mutant of *S. dysenteriae* requiring proline for growth is reported from the Biology Department of the University of New Mexico.



2685 RUBIN, B. A.

**Growth and mutation of bacteria during continuous irradiation.**

J. Bact. 1954 : 67 : 361-68.

Experiments at the Brookhaven National Laboratory, Upton, NY, on the rate of growth of strains B and B/r of *Escherichia coli* have shown that irradiation with X rays increases the lag before the inception of growth but does not inhibit the actual growing capacity of the bacterium. The mutation frequency increased as a function of the total irradiation given and displayed no correlation with rate of growth.

2686 SCHERR, G. H., FISHMAN, M. & WEAVER, R. H.

**The mutagenicity of some carcinogenic compounds for *Escherichia coli*.**

Genetics 1954 : 39 : 141-49.

Treatment of *E. coli* B/r with 20-methylcholanthrene, 1,2,5,6-dibenzanthracene- $\alpha,\beta$ -endosuccinate, 3,4-benzpyrene, 9,10-bis(hydroxymethyl)-1,2-benzanthracene and o-aminoazotoluene resulted in an increased rate of production of B/r/l mutants. The three last-named carcinogens were strongly mutagenic.

2687 DIANZANI, M. V.

**Modification of some enzymatic characters of a strain of *Staphylococcus albus* obtained by treatment with desoxyribonucleic acid from other staphylococci.**

Exp. Cell Res. 1953 : 2 : 311-19.

In experiments at the Department of Pathology of the University of Genoa, Italy, treatment of a strain of *S. albus* with nucleoprotein fractions from two other strains, or with dead cells of these two strains, induced mutants possessing stable oxidative activities against methionine and cystine.

2688 RYAN, F. J., FRIED, P. & GONZALEZ, E.

**On the inability of antibodies to induce mutations in bacteria.**

Amer. Nat. 1953 : 87 : 383-87.

No evidence was obtained that  $\gamma$ -globulin anti- $\beta$ -galactosidase had any mutagenic effect upon the genes for lactose utilization and nonutilization in *Escherichia coli*.

2689 DE, M. L., GUHA, A. & DAS-GUPTA, N. N.

**Phase contrast and electron microscopic studies on the nuclear apparatus of *Escherichia coli*.**

Proc. roy. Soc. 1953 : Ser. B : 141 : 199-203.

Micrographs obtained by means of the phase microscope indicated that the contrast difference

between the cytoplasmic and nuclear sites in *E. coli* varied according to the age of the culture. Direct-transmission electron micrographs showed that the nuclear sites had a smaller electron-scattering power than the cytoplasm. Electron micrographs of shadowed bacterial replicas provided evidence of depressions in the nuclear sites.

2690 MAGASANIK, B. & BROOKE, M. S.

**The accumulation of xanthosine by a guanineless mutant of *Aerobacter aerogenes*.**

J. biol. Chem. 1954 : 206 : 83-87.

The occurrence of an ultraviolet-induced mutant, strain P-14, requiring guanine is reported. Such a type of mutant has only been previously observed in *Ophiostoma multiannulatum* (cf. PBA, Vol. XXIII, Abst. 1733). Mutant P-14 is able to synthesize the purine ring, as shown by its accumulation of xanthosine, but is apparently unable to convert purine into guanine.

2691 MEIER, R., SCHÄR, B. & NEIPP, L.

**Die Wirkung von Demecolceinamiden an Zellen *in vitro*. (The effect of demecolceinamides on cells *in vitro*).**

Experientia 1954 : 10 : 74-76.

Data on the lethal and mitotic effects of a series of demecolceinamides upon cells of *Staphylococcus aureus*, *Streptococcus faecalis* and *Bacillus megatherium* are given.

2692 MIHALEVA, V. V.

**(Change of properties of nodule bacteria under the influence of antagonistic *Actinomyces*).**

Agrobiologija (Agrobiology) 1953 : No. 5 : 100-04. [Russian].

Nodule bacteria from clover when first cultured in the presence of *Actinomyces* sp. were inhibited in growth; by repeated passages through a medium containing *Actinomyces*, however, a resistant strain was obtained; it also proved less virulent in infecting clover roots, was less active in utilizing glucose, fructose and lactose and differed from the original strains in a certain number of other features too.

2693 MATSUI, C.

**(On mutation of strain B 19 of *Pseudomonas solanacearum* to virus resistance).**

Kyushu Daigaku Nogakubu Gakugei Zasshi/Sci. Bull. Fac. Agric. Kyushu Univ. 1953 : 14 : 251-55. [Japanese].

Mutation of the above strain to resistance to virus SP<sub>1</sub>B<sub>19</sub> at a rate of  $1.6 \times 10^{-8}$  is reported. The acquired resistance is attributed to failure



to adsorb this particular virus; susceptibility to other viruses was not affected.

- 2694 LULLA, B. S. & JOHAR, D. S.  
**Formation of red pigment by a mutant of *Penicillium notatum*.**  
 Curr. Sci. 1954 : 23 : p. 123.

A mutant of *P. notatum* 'CFTRI 1013' secreting a red diffusible pigment is reported from the Central Food Technical Research Institute, Mysore. Data on the properties and rate of production of the pigment are given.

- 2695 GOMES, M. R. M.  
 Seleção racial de *Aspergillus niger* para produção de ácido cítrico. (**Racial selection of *A. niger* for producing citric acid**).  
 Agron. lusit. 1953 : 15 : 243-48.

The capacity for producing citric acid was studied in 55 races of *A. niger* and by selection for high capacity five superior races were established.

- 2696 JINKS, J. L.  
**Heterocaryosis : a system of adaptation in wild fungi.**  
 Proc. roy. Soc. 1952 : Ser. B : 140 : 83-99.

Experimental evidence has been obtained that in wild *Penicillium cyclopium* variation in nuclear ratio affords a means of immediate somatic adjustment to a new food supply or of a progressive adjustment to a changing one. Heterocaryosis in wild *Penicillium* is regarded as a system of limited variation and adaptation well suited to the needs of a saprophytic mode of life. Such a system of flexible physiological control over nuclear behaviour through the cytoplasm is, however, restricted from the evolutionary point of view by the corresponding sacrifice in the long-term genetic plasticity conferred by the sexual cycle. Arguments are given in support of the author's view that dicaryons of heterothallic Basidiomycetes differ both in their past evolution and present-day function from the heterocaryons found in wild *Penicillium* spp.

- 2697 TSUDA, S.  
**(Studies on heterocaryosis in *Aspergillus* and *Penicillium*).**  
 Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 150-52. [Japanese].

A heterocaryon between strains 5-9 and N-19 of *A. awamori* was obtained; it was intermediate between the parent strains in the colour and morphology of the colony. A heterocaryon was also produced between two ultraviolet-induced mutants of *P. chrysogenum* 'Q 176,' one

forming dissected yellow colonies and the other smooth colourless colonies, while both produced colourless conidia. The heterocaryon, in this case, produced green conidia like the typical strain; the heterocaryon varied considerably in pigmentation and morphology, presumably owing to different proportions of the parental nuclei in the cells.

- 2698 KUWANA, H.  
**Studies on the morphological mutant "cut" in *Neurospora crassa*.**  
 Cytologia, Tokyo 1953 : 18 : 235-39.

An ultraviolet-induced mutant, termed "cut" on account of the appearance of the hyphal tips in test-tube cultures, was determined by a single recessive gene inherited independently of the mating-type factor. The sparse growth of the mutant was probably due to an inability to maintain a suitable turgor pressure of the cell, possibly as the result of physiological changes in the cell membrane.

- 2699 ST. LAWRENCE, P.  
**The association of particular linkage groups with their respective chromosomes in *Neurospora crassa*.**  
 Diss. Abstr. 1954 : 14 : Publ. No. 6694 : 7-8.

Data from crosses between stocks with translocations and normal strains led to the following conclusions: linkage group I is associated with chromosome 6, *lys* being situated in the long arm and the mating-type locus in the short arm; the long arm of chromosome 1 bears the factors "microconidial" and "fluffy" belonging to group II; and group IV is associated with chromosome 2, the locus of *pan* probably being in the short arm.

- 2700 TANENBAUM, S. W., GARNJOBST, L. & TATUM, E. L.  
**A mutant of *Neurospora* requiring asparagine for growth.**  
 Amer. J. Bot. 1954 : 41 : 484-88.

An X-ray-induced mutant of *N. crassa* requiring asparagine for growth was found to depend upon a single gene (*asp*) situated in linkage group V. Its requirement was highly specific; glutamine, aspartic acid and tricarboxylic-acid intermediates could not be substituted for asparagine. The mutant exhibited inexplicable differences between its response on solid medium and in liquid culture to either  $\beta$ -aspartohydroxamic acid and glycylasparagine. Asparaginase was present in both the mutant and wild types; asparagine synthesis in *Neurospora* may be attained by a pathway not yet discovered.



- 2701 ATWOOD, K. C. & MUKAI, F.  
**Homology patterns of X-ray-induced lethal mutations in *Neurospora*.**  
Radiation Res. 1954 : 1 : No. 1 : p. 125.  
(Abst.).

When simple two-component heterocaryons bearing recessive lethal mutations are allowed to form complex heterocaryons, new combinations of lethal nuclei are obtained. If conidia containing these new combinations are viable the lethals are nonhomologous in the sense that they involve qualitatively different genetic elements. Tests were carried out on 4950 different two-by-two combinations among 100 X-ray-induced lethals; 3331 gave nonhomologous, 635 equivocal and 984 presumably homologous reactions. Only 30 of the lethals accounted for 98.0% and 98.4% of the two last-named categories, respectively. It was inferred that most of the large chromosomal deficiencies induced are not recovered because they have an autonomous nuclear lethal effect.

- 2702 TISSIERES, A. & MITCHELL, H. K.  
**Cytochromes and respiratory activities in some slow growing strains of *Neurospora*.**

J. biol. Chem. 1954 : 208 : No. 1 : 241-49.

Investigations on the mutant strains mi-3, C 115 and C 117 are reported (cf. Abst. 1672). Spectroscopic analysis showed that (1) mi-3 contains a high concentration of cytochrome c, some cytochrome b and a very small amount of  $a_1$ ; (2) C 115 has a content of c equal to that of mi-3, a little cytochrome b and a hardly detectable amount of a; and (3) C 117 contains only b and e. Respiration in mi-3 was of the same order as that of the wild type, and was inhibited by azide and cyanide; the respiration of C 117 was lower than that of any other strain so far investigated, including poky, and was not markedly affected by azide and cyanide; determination of the respiratory activities of C 115 was complicated by frequent mutation to a genetically suppressed phenotype possessing selective value.

- 2703 EL-ANI, A. S.  
**The genetics of sex in *Hypomyces solani* f. *cucurbitae*.**  
Amer. J. Bot. 1954 : 41 : 110-13.

Two types of asci were found, one with 4 ♀ : 4 ♂ and the other with 2 ♀ : 2 ♂ : 2 ♀ : 2 ♂. The ratio between these two types of asci was approximately 1 : 1. Possible causes of these sex ratios are considered.

- 2704 KILKENNY, B. C. & HINSHELWOOD, C.  
**Changes in the growth characteristics of yeast on union of haploids, and segregation of haploids from diploids.**  
Proc. roy. Soc. 1952 : Ser. B : 140 : 352-61.

Two crosses were studied, M 25a x F 6a and M 25b x F 6a; M 25a was galactose +, whereas F 6a and M 25b were classed as galactose - according to the criterion of their failure to show growth on galactose medium within 10 days. On medium to which galactose, glucose and raffinose had been added, the potential growth rate of the diploid hybrids was greater than that of the parental haploids or of the haploid segregates produced by sporulation of the hybrids, but this advantage was only expressed after training. On sporulation of the hybrids both regular segregation and a continuous range in fermentative ability were obtained for galactose utilization. Data from the cross M 25b x F 6a suggested that M 25b possessed a secondary galactose-utilizing mechanism which came into operation more rapidly as the result of the auxiliary action of F 6a, so that the hybrid diploid was quasipositive for galactose utilization. It is suggested that, although diploids possess greater potentialities for growth than haploids, the more complex cellular organization required to exploit these may be more difficult to establish by the appropriate adaptive processes, after disturbance of the haploid organization by hybridization. The initial behaviour of the diploids before training may thus be erroneously attributed to suppressor genes.

- 2705 NICKERSON, W. J. & CHUNG, C. W.  
**Genetic block in the cellular division mechanism of a morphological mutant of a yeast.**  
Amer. J. Bot. 1954 : 41 : 114-20.

The filamentous growth of a mutant of *Candida albicans*, under conditions that permit the normal strain to grow as a budding yeast, results from a genetic block in its mechanism of cellular division.

- 2706 NICKERSON, W. J.  
**An enzymatic locus participating in cellular division of a yeast.**  
J. gen. Physiol. 1954 : 37 : 483-94.

Further investigations on a filamentous mutant of *Candida albicans* (cf. Abst. 2705) have suggested that this mutant differs from the normal strain in its flavoprotein-catalysed reductions at mitochondrial sites.



## 2707 LASKOWSKI, W.

Induction, par le chlorure de tétrazolium, de la mutation "petite colonie" chez la levure. (**Induction by triphenyltetrazolium chloride of the "dwarf colony" mutation in yeast**).

Heredity 1954 : 8 : 79-88.

Triphenyltetrazolium chloride was shown to have a mutagenic effect on *Saccharomyces cerevisiae*, giving rise to dwarf colonies with cells morphologically and physiologically similar to the respiratory deficient mutants described by Ephrussi (cf. *PBA*, Vol. XXIII, p. 656).

2708 KILKENNY, B. C. & HINSHELWOOD, C.  
**An investigation of some adaptive changes in yeast cells.**

Proc. roy. Soc. 1952 : Ser. B : 139 : 575-83.

The training of haploid strains to dispense with the addition of aneurin to the medium and also the training of a diploid strain to utilize raffinose were in each case found to consist of an adaptive process affecting the bulk of the population rather than a selection of a few exceptional mutant cells (cf. *PBA*, Vol. XXII, Abst. 964).

2709 TOWNSEND, G. F. & LINDEGREN, C. C.  
**Structures in the yeast cell revealed in wet mounts.**

Cytologia, Tokyo 1953 : 18 : 183-201.

The authors describe the centrochromatin, mitochondria and intravacuolar structures as observed in unstained and stained living cells (cf. *PBA*, Vol. XXI, p. 227 and Vol. XXIII, Abst. 1757). Detailed descriptions are given of the techniques devised for staining the constituents of unfixed cells with toluidine blue, thionin and other dyes in preparations which could be preserved for a few days by freeze-drying.

## 2710 SARACHEK, A.

**Ultraviolet inactivation of *Saccharomyces* during the budding cycle.**

Exp. Cell Res. 1954 : 1 : 45-55.

At the Biological Research Laboratory, Carbon-dale, Ill., analysis of the survival curves of cells of a synchronously budding yeast population exposed to ultraviolet irradiation has led to the following conclusions: (1) the rate at which the monocaryotic cells in a population are inactivated is positively correlated with the number of irradiations required to inactivate the individual cells; (2) target values for dicaryotic cells are related to the total content of deoxyribose nucleic acid present in the cells; (3) variations in the relative amounts of cyto-

plasm and deoxyribose nucleic acid influence the amount of damage cells may sustain prior to inactivation but have no effect upon the degree of inactivation of the cell; and (4) the primary events in the process of inactivation are nongenic and probably involve the heterochromatin.

## 2711 BEAM, C. A., MORTIMER, R. K., WOLFE, R. G. &amp; TOBIAS, C. A.

**The relation of radioresistance to budding in *Saccharomyces cerevisiae*.**

Arch. Biochem. Biophys. 1954 : 49 : 110-22.

Evidence has been obtained that budding cells of haploid yeast are resistant to high doses of X rays and constitute the surviving component of the irradiated population. Some biophysical and biochemical properties of the dividing yeast nucleus are briefly discussed as possible causes of this resistance. According to preliminary observations, budding cells of  $2n$  and  $4n$  strains of yeast are also highly resistant to X radiation.

## 2712 CAMPBELL, A. M.

**The quantitative aspects of long term adaptation in yeast.**

Diss. Abstr. 1953 : 13 : Publ. No. 5949 : p. 949.

The results of experiments on some quantitative aspects of galactose deadaptation and the reacquisition of the relevant enzyme-forming system in strains of *Saccharomyces chevalieri* of the genotype  $g_s$ , characterized by long-term adaptation of galactose, are summarized. The results were consistent with the view expressed by Spiegelman and his colleagues that adapted cells contain cytoplasmic enzyme-forming elements undergoing multiplication only in the presence of galactose.

2713 WICKERHAM, L. J. & BURTON, K. A.  
**A simple technique for obtaining mating types in heterothallic diploid yeasts, with special reference to their uses in the genus *Hansenula*.**

J. Bact. 1954 : 67 : 303-08.

The following techniques for studying the genetics of yeasts producing asci that rupture when mature were developed at the Regional Research Laboratory, Peoria, Ill.: (1) isolation of cultures derived from single ascospores; (2) determination of whether a diploid yeast is homothallic or heterothallic; (3) isolation of mating types from diploid, heterothallic species; (4) obtaining more highly sporogenous pairs of mating types of diploid, heterothallic yeasts; (5) production of perfect forms of sexually active haploid species; (6) synthesis of diploid



strains from haploid isolates of intermediate development; (7) isolation and analysis of diploid hybrids; (8) isolation and analysis of haploid hybrids. Of the species of *Hansenula* so far studied, those with hat-shaped spores are heterothallic and types having crescent-shaped ascospores are homothallic.

- 2714 LINDEGREN, C. C. & HADDAD, S. A.  
**Growth rates of individual yeast cells.**

Genetica 1954 : 27 : 45-53.

Calculation of cell volumes from photographs of growing cells indicated that increase in the volume of the buds is constant and linear, and appears to begin and end abruptly. The volume of the mother cells remains constant. The growth of yeast cells is diphasic: during budding only extranuclear material is synthesized whereas during the period of constant volume only nuclear material is synthesized. The constancy of the growth rate during the cytoplasmic increase suggests that the genome acts constantly at a linear rate in the synthesis of the enzymes required for growth.

- 2715 HJORT, A.  
**Some studies on the genus *Saccharomyces* Hansen.**

C. R. Lab. Carlsberg 1954 : Sér. physiol. : 25 : 259-84.

Strains of *Saccharomyces* were studied with respect to spore formation and germination, behaviour of single-spore cultures, the characteristics of giant colonies and fermentation; it is suggested that the genus should be reduced to one species, *S. ludwigii*, with only one variety, viz. var. *bisporus* (*S. bisporus* Castelli).

- 2716 RAPER, J. R. & SAN ANTONIO, J. P.  
**Heterokaryotic mutagenesis in Hymenomycetes. I. Heterokaryosis in *Schizophyllum commune*.**

Amer. J. Bot. 1954 : 41 : 69-86.

True heterokaryosis was found to occur in matings of strains possessing common factors at the locus *A* for incompatibility. Since the nuclei of the component strains were reciprocally unequal in number, each of the two heterokaryons contained a predominant nuclear type and a secondary one. Common-*A* heterokaryons could be distinguished from homokaryotic and dikaryotic mycelia not only by their mating behaviour but also by their morphology, depressed growth and lower rate of glucose utilization. Interaction between the component elements of the heterokaryon was apparently biochemically antagonistic. Nutritionally balanced heterokaryons were probably induced

between strains of the same mating type, under conditions of an appropriate minimal medium. Heterokaryosis in *S. commune* is compared with that occurring in the Phycmycetes, Ascomycetes and Fungi Imperfecti.

- 2717 AOSHIMA, K.

**Decay of beech wood by the haploid and diploid mycelia of *Elfvigia applanata*.**

Phytopathology 1954 : 44 : 260-65.

Haploid mycelia derived from the basidiospores of a single fruit body differed considerably in wood-rotting ability, producing 10.39-82.20% loss in weight of wood blocks of *Fagus crenata*. No relationship between sexual factors and rotting ability was found. Diploid isolates also exhibited variation in rotting ability, which was not correlated with locality or host. Diploid mycelia obtained by pairing haploid mycelia derived from basidiospores of the same fruit body showed a lower range of variation in rotting ability than haploids from the same source. No differences in capacity to cause decay were exhibited by the two types of mycelia,  $A_1B_1 \times A_2B_2$  and  $A_1B_2 \times A_2B_1$ . The variation of diploid mycelia in producing rot was not related to the differences characterizing their haploid progenitors.

- 2718 KIMURA, K.

**Studies on the sex of *Coprinus macrorhizus* Rea f. *microsporus* Hongô. I. Introductory experiments.**

Biol. J. Okayama Univ. 1952 : 1 : 72-79.

The above fungus was found to be heterothallic and to possess two independent inherited pairs of alleles, *Aa* and *Bb*, for sexuality. Hyphae of the diploid mycelium grew more rapidly than those of the haploid. Monosporous mycelia were sexually highly stable.

- 2719 KIMURA, K.

**Studies on the sex of *Coprinus macrorhizus* Rea f. *microsporus* Hongô. II. On the sexual strains.**

Biol. J. Okayama Univ. 1952 : 1 : 80-83.

The strains studied each contained four sexual groups (cf. Abst. 2718). With one exception, the strains differed with respect to their genetic constitution for sexuality. Two intrafertile but intersterile groups of strains were established.

- 2720 PAPAZIAN, H. P.

**Exchange of incompatibility factors between the nuclei of a dikaryon.**

Science 1954 : 119 : 691-93.

The possibility of an exchange of incompatibility factors between the nuclei of a dikaryon was



investigated in *Schizophyllum commune* by means of the so-called flat heterocaryons formed by two monocaryons differing only in their *B* factors, and as the result of noncompatible di-mon matings before the formation of the new dicaryons. The flat heterocaryons can easily be separated into their components by isolating single hyphal tips. Six matings of the type  $[(A^1B^1s \times A^2B^2m^1) \times A^1B^2] \times A^2B^2$  all produced regions of flat mycelia; the factor *s* for a morphological mutant is linked with *A*; *m*<sup>1</sup> determines an uracil-requiring mutant and is not known to be linked with any other gene. Hyphae from subcultures of these regions were mated with the testers  $A^1B^1$ ,  $A^2B^2$ ,  $A^1B^2$  and  $A^2B^1$ . In the case of the cultures derived from three of the original matings only  $A^2B^2$  types were recovered. In the case of the other three, some of the cultures gave all the reactions with the testers consistent with an incompatibility type  $A^2B^1$ , and were all of the *s*<sup>+</sup> and *m*<sup>1</sup> type. It is therefore concluded that the  $A^2B^1m^1$  monocaryon had been formed by an interchange of genetic material between the nuclei of the original dicaryon ( $A^1B^1s + A^2B^2m^1$ ).

2721 HOLMES, F. O.

**Mutual adaptations in viruses and their hosts.**

34th Rep. Quebec. Soc. Prot. Pl. 1952 (1953) : 116-27.

This account of mutation, specialization and adaptation in viruses describes the mechanism of natural selection in both host plant and pathogen.

2722 LARSON, R. H.

**The induction of mutants in potato virus X by nitrogen mustard.**

34 Rep. Quebec Soc. Prot. Pl. 1952 (1953) : 99-100.

A fuller account of the contents of this paper has already been summarized in *PBA*, Vol. XXII, Abst. 1700.

2723 GINOZA, W., ATKINSON, D. E. & WILDMAN, S. G.

**A differential ability of strains of tobacco mosaic virus to bind host-cell nucleoprotein.**

Science 1954 : 119 : 269-71.

Groups I and II of tobacco mosaic strains have been found to differ in their ability to form a stable complex with a nucleoprotein derived from the host cell (cf. Abst. 1697).

2724 BEST, R. J.

**The development and multiplication of viruses.**

J. Aust. Inst. agric. Sci. 1954 : 20 : 36-40.

In the course of a survey of hypotheses on the

above, the author describes the behaviour of strains of the tomato spotted wilt virus, as observed at the Waite Institute, Adelaide, Australia. Modifications in the effects of strains of this virus, when the strains were either inoculated into the plants at different times or together, suggested that at any early stage in the process of multiplication the strains exchanged symptom-causing determinants.

2725 LEVINTHAL, C.

**Recombination in phage T2: its relationship to heterozygosis and growth.**

Genetics 1954 : 39 : 169-84.

Crosses between  $hr_2^+r_1$  and  $h^+r_2r_1^+$  phage gave results which are interpreted as showing that particles heterozygous for the middle marker,  $r_2$ , were generally recombinants for the two end markers. A model for a phage heterozygote is therefore proposed which involves a small overlapping region regarded as a partial diploid section of a haploid chromosome. Evidence was obtained that such heterozygotes are intermediates in the production of haploid recombinants in the vegetative noninfective pool. It is suggested that a phage heterozygote is not constructed out of portions of previously formed chromosomes but arises *de novo* under the control of two parental structures, according to a model based on the structure of deoxyribonucleic acid proposed by Watson and Crick (cf. *PBA*, Vol. XXIII, Absts. 57 and 58).

2726 BOYD, J. S. K.

**Bacteriophage and heredity.**

Nature 1954 : 173 : 1050-51.

Phages A3 and A4 infecting *Salmonella typhimurium* were found to endow all the bacteria with which they entered into symbiosis not only with lysogenicity but also with the property of nonadsorption or true resistance. Both these characters were hereditary and transmitted indefinitely through subsequent generations. It is suggested that this inability to adsorb the phage, like that of mutants resistant to lytic phages such as those of the T series, is attributable to some phage-initiated change in the receptor mechanism in adsorption; possibly the phage either eliminates or blocks the gene controlling receptor formation.

2727 RALSTON, D. J. & KRUEGER, A. P.

**The isolation of a staphylococcal phage variant susceptible to an unusual host control.**

J. gen. Physiol. 1954 : 37 : 685-716.

The host range of a phage variant was found to vary according to the previous host on which



the phage was produced. This susceptibility to host control was possessed by all the particles of the strain. The observed alterations did not appear to be caused by extracellular substances. The possible nature of the change involving susceptibility to host control is discussed; the results could not be readily explained on a mutational basis.

## CROP PLANTS

- 2728 v.B., C. J.  
 Inschrijving in het Centraal Rassen-  
 register. (**Entries in the Central  
 Variety Register**).  
 Meded. Ned. Alg. Keuringsdienst  
 Landbouwzaden Aardappelpootgoed  
 1954 : 11 : 19-20.

Varieties of wheat, oats, barley, potato, flax, bean and pea added to the Netherlands central variety register in May 1954 are listed, together with the name and address of the respective breeder.

- 2729 ROLL-HANSEN, J.  
**Definition of the terms cultivar and strain.**  
 Acta agric. Scand. 1954 : 4 : 237-38.

The author comments upon the use of the terms cultivar and strain, as defined in the International Code of Nomenclature for Cultivated Plants (cf. p. 142); he briefly draws attention to the desirability of cataloguing cultivars in an international register.

- 2730 **The state of food and agriculture 1953. Part II. Longer term prospects.**  
 FAO UN, Rome 1954 : Pp. 83.

World and regional estimates of agricultural production for 1956/57 are presented. Chapter III, dealing with technical and other factors affecting the achievement of the production objectives, includes a short section surveying the contribution likely to be made by the production and distribution of improved varieties in different countries.

- 2731 **International cooperation is improving our crops.**  
 Agric. Res., Wash. 1954 : 2 : No. 12 : 6-7.

A short popular account is given of cooperative projects between the United States and other countries, as exemplified by the testing of varieties and selections for disease resistance and other characters or the increase of material to speed up breeding programmes in wheat, oats, maize, potato and cotton.

- 2732 **Report on the work of the college of the West of Scotland Agricultural College for the year ended 30th September, 1953 : Pp. 59.**

**Forage grasses.** Strain trials of ryegrasses, cocksfoot and other grasses are in progress.

**Tomato.** Hybrids between the tomato and *Lycopersicon peruvianum* were selected for disease resistance and other characters.

- 2733 **Twenty-second Annual Report of the Minister for Agriculture, Dublin 1952-53 : Pp. 195 + 89.**

*Seed Propagation Division. (pp. 88-94).*

The results from trials of varieties and new selections of barley at the Cereal Station, Ballinacurra, are reported. In the European Brewery Convention trial, Carlsberg gave a higher yield of grain than Beorna, Kenia and Earl.

*Appendices. Report of the Agricultural Department, University College, Dublin, for the year 1952-53. (pp. 1-19).*

**Wheat.** New types of Glasnevin Rosa with the capacity of better growth in the early stages of development and strong resistance to shattering are being developed; derivatives of crosses with Kärn have so far shown most promise. Two valuable new hybrids have been obtained from Atle x Fylgia and Kärn x Fylgia, respectively.  
**Oats.** One aim of breeding is the production of a hybrid of the Glasnevin Triumph type with shorter and stiffer straw; promising selections from crosses of this variety with Glasnevin Bonstar have not yet been tested for yield. A new variety of the Potato type will be released for cultivation in the west of Ireland, if its resistance to lodging proves satisfactory; it has outyielded the Potato (Ardee) oat and equalled Variety 2 in grain size and quality.

**Barley.** Breeding for short-strawed varieties suitable for growing on fertile soils continued. Three derivatives of Kenia x Spratt Archer were distributed for general cultivation. Selections of Kenia x Maja, Earl x Ymer, Kenia x Ymer, Karn x Herta, Binder x Ymer and Herta x Spratt Archer 37/3 are being compared with Spratt Archer and Herta. Two hybrids of Spratt Archer x (Spratt Archer x Kenia) bearing pigmented and nonpigmented grain and showing very vigorous early growth are to be further selected.

**Pasture plants.** Indigenous strains of perennial ryegrass, cocksfoot, timothy, meadow fescue and red clover are being developed from plants in old productive pastures. The initially chosen plants are subjected to polycross and diallel tests for selection of superior genotypes.



A new composite strain of cocksfoot, Glasnevin 8, developed from plants of Irish, English, Dutch and Scandinavian origin is under test.

**Small fruits.** Promising selections of raspberry and strawberry have been produced.

**Vegetables.** Improved selections of Brussels sprouts have been developed; they have proved especially suitable for quick freezing.

Tomato strains resistant to *Cladosporium* were back-crossed with commercial varieties to improve their size. The resistance of some strains broke down, as the result of either back-crossing to susceptible varieties or the appearance of new strains of the fungus.

**2734 The Research and Experimental Record of the Ministry of Agriculture, Northern Ireland 1952 (1954) : Pp. 114.**

**Oats.** Of approximately 250 varieties, Black Winter was least susceptible to manganese deficiency.  $F_6$  selections from the cross Stormont Arrow x Elder combined satisfactory resistance to lodging with high quality grain and straw. From the cross Stormont Iris x S 225, a strong correlation appeared to exist between the straw and ear type of S 225.

**Potato.** Of the varieties tested, Ulster Ensign, Arran Pilot and Arran Banner were free from virus X. At Stormont, Arran Pilot gave the highest yield among early, and Ulster Ensign among medium-early varieties, whilst Ulster Supreme was superior in main-crop trials. In county trials, Stormont Dawn and Arran Banner gave the best yields.

**Flax.** The majority of plants in the  $F_2$  of the cross La Plata x Textilshchik [Textile Worker] possessed the resistance of the former parent to *Polyspora lini*. Data so far obtained suggest that resistance to *P. lini* is governed by a single dominant gene.

**Forage beet.** The varieties Hunsballe X, Pajbjerg Rex X and Red Øtofte X all gave satisfactory yields, Hunsballe X having the highest dry-matter content.

**2735 Forty-fourth Annual Report of the John Innes Horticultural Institution for 1953 (1954) : Pp. 35.**

Brown, A. G. Pomology Department.  
(pp. 7-12).

**Solanum.** Inheritance of the intensity of the green colour of unripe fruit of *S. pseudo-capsicum* is controlled by a major gene. No segregation for this character occurred in crosses within this species, but  $F_1$  and  $F_2$  hybrids between *S. pseudo-capsicum* and *S. capsicastrum* exhibited wide variation; the latter species probably contains modifiers for unripe fruit colour. An abnormal plant of *S. capsicastrum* represented

an example of a single gene with numerous pleiotropic effects and delayed action.

**Apple and pear.** No close relationship has been found between seedling vigour and chromosome number in apple. Reaction to apple mildew (*Podosphaera leucotricha*) shows a considerable range within a single family. Different apple varieties were crossed to assess their value in breeding for resistance to this disease.

Stamen and style number showed little variation in pear (cf. Abst. 3290).

Seeds have been obtained from further pear-apple crosses (cf. PBA, Vol. XXIII, Abst. 2464).

**Rubus.** In the blackberry Merton Thornless 17% outcrossing occurred on the average; conditions affecting this outcrossing are indicated (cf. Abst. 3339).

Biometrical analysis of plant and fruit characters of the raspberry has been initiated.

**Strawberry.** Further selections were obtained from crosses made in 1950.

Susceptibility to June yellows is apparently confined to certain varieties. This disorder is not pathological; affected plants have undergone a heritable change of a type not yet understood.

Sepal and petal number were found to alter only slightly with increased chromosome number in a range of  $2x$  to  $10x$  clones and the  $12x$  genus *Duchesnea*. Stamen number increased from approximately 20 in  $2x$ ,  $4x$  and  $6x$  clones to 35 in  $8x$  clones and to just over 30 in  $10x$  plants.

**Tomato.** Two  $F_1$  hybrids,  $H_1$  (Potentate x LMR 1) and  $H_2$  (Potentate x ES 1), surpassed Potentate in earliness, total yield and quality under commercial conditions. They have been named Hertford Cross and Ware Cross, respectively. Seed has been distributed for further trial.

A mutant of Antimold B lacking lateral shoots depends upon a single recessive gene. Unfortunately absence of petals and partial male sterility are associated with this character, and the small amount of pollen produced is not liberated satisfactorily from the anthers. An attempt is being made to incorporate the character of absence of side shoots in a variety with good fruit-setting capacity.

**Sweet corn.** Six inbred lines adapted to local growing conditions have been combined reciprocally in  $F_1$  single crosses; they are to be tested in the coming season.

Lewis, D. Genetics Department.  
(pp. 13-17).

**Incompatibility**

In work on X-ray-induced and spontaneous mutation in *Trifolium*, 10% of the changes in

the incompatibility system in *T. pratense* ( $2n = 14$ ) consisted of permanent mutations causing self fertility and affecting the pollen-controlling part of the *S* complex; the remainder were revertible mutations for self sterility. *T. repens* ( $2n = 32$ ) gave rise to 66% permanent mutations for self fertility, alterations in the pollen-determining or in the style-controlling part of the *S. complex* being induced. It is suggested that the permanent self-fertile changes were loss mutations; such mutations might be lethal in *T. pratense* but tolerated by the tetraploid species *T. repens*, thus accounting for the higher number in the latter species. A revertible X-ray-induced mutation also occurred in *Prunus avium*. Permanent and temporary mutations have previously been reported for *Oenothera* (cf. *PBA*, Vol. XXI, Abst. 2416).

Evidence of a system of polygenic modifiers closely linked with the locus *S* was obtained from experiments on *Primula obconica*; only two alleles occur at this locus. The locus *S* was found to be homologous in five species of *Oenothera*; no polygenic modifiers affected the multiallelic system of incompatibility in these species.

**Sweet cherry.** Crossing has been effected between self-fertile seedlings produced by X irradiation and varieties of commercial standard. A promising self-fertile seedling derived from untreated self-pollinated material is outstanding for its early maturity. This earliness is probably due to the uncovering of recessive genes by inbreeding; selfing may therefore be a useful means of obtaining new forms.

**Lettuce and onion.** Investigations have been carried out on the cytological effects of aging in stored seeds (cf. Abst. 2664).

**Tomato.** Experiments have been carried out on environment-genotype interactions (cf. Abst. 775).

Five races of *Cladosporium* have been distinguished (cf. Abst. 967). Competition occurred between races, the more highly specialized race suppressing the less highly specialized member of a given pair.

Five varieties characterized by nonshedding pollen, a seedling marker and long styles have been developed, to facilitate the production of  $F_1$  hybrid seed.

La Cour, L. F. Cytology Department.  
(pp. 18-20).

### Chromosome breakage

X ray experiments on the endosperm of *Scilla sibirica* (cf. *PBA*, Vol. XXIII, p. 660) have indicated that point errors at anaphase are

induced only by treatment during prophase. These errors generally appear as chiasma-like structures, which are attributed to breakage and reunion of subchromatids.

Spontaneous chromosome breakage has been observed in the endosperm of a *Lilium* hybrid, Edna Keen (cf. Abst. 1625). In crosses between hyacinth varieties the frequency of chromosome and spindle abnormalities in endosperm cells rose as the chromosome number of this tissue increased. The primary cytological errors in both genera were similar to the point effects induced by irradiation at prophase. In chromosomally unbalanced forms, the breakage initiated by these errors accumulates, resulting in endosperm failure and embryo abortion; this abnormal behaviour thus behaves as a selective mechanism.

Experiments on chemically induced localized breakage in *Vicia faba* continued. Acentric fragments resulting from maleic hydrazide treatment could be classified into four types at  $X_1$  mitosis (first division after chemical treatment) according to the manner in which the euchromatin, heterochromatin and nucleolar organizers were combined or separated by breakage and reunion. By means of acentrics which reproduce in subsequent mitoses, breakage has been found to be deferred in  $X_2$  and  $X_3$  cells for at least 28 days. This deferred breakage may be explained by one or two possible ways: (1) a multiple-strand structure of the chromosome, the deferred breakage being due to the sorting out of already broken strands during successive mitoses, or (2) the persistence of maleic hydrazide for long periods after treatment.

**B chromosomes.** Typical B chromosomes have been found in some diploids of *Ranunculus ficaria*.

**Pear.** In the  $2n$  variety Beurré Bedford, known to give rise to polyploid progeny, pollen meiosis was normal but no cell walls were formed, the four resultant nuclei all lying within the same wall. Fusion of the mitotic spindles in pollen-grain division resulted in the formation of  $n$ ,  $2n$ ,  $3n$  and  $4n$  grains, all of which were viable. Meiosis and subsequent divisions in the embryo sac were normal. Using Beurré Bedford as ♂ parent, seedlings with up to 85 chromosomes have been obtained.

**Rubus.** The tetraploid veitchberry (BBRR) apparently behaves as an apomict when not pollinated but sexually when crossed with the raspberry. Its ability to reproduce apomictically depends upon seasonal conditions.

**Tomato.** The partial pollen sterility of the



mutant lacking side shoots, referred to above, is caused by postmeiotic breakdown. All the pollen produced by the  $F_1$  between this mutant and ordinary tomato is normal and functional.

2736 HAYWARD, P. R.

**Fifth Report of Trial and Experimental Work carried out at "Throws", Little Dunmow 1952/53 :** Hasler & Co. Ltd., Dunmow, Essex : Pp. 48.

**Wheat.** Tests were carried out on selections possessing the rogue character of red chaff and red grain. Lines derived from Petit Quin Quin [(Vilmorin 23 x Institut Agronomique) x Providence] have bred true for this character and have exhibited short straw, good standing ability, satisfactory yielding ability and improved grain quality.

Crosses of Eclipse x Petit Quin Quin, Benoist 40 x Eclipse and Holdfast x Nord Desprez are being studied.

**Barley.** Selection failed to improve the standing ability of Pioneer; attention is therefore to be given to breeding a winter barley with stronger straw.

**Vicia faba.** The results of winter-bean breeding have indicated that the method of building up high-yielding stocks from progenies obtained from mainly cross-bred material and the subsequent mixing of these stocks in definite proportion in a composite is more likely to be successful than a strict adherence to the pure-line method. The conclusions of Fyfe and Bailey are thus confirmed (cf. *PBA*, Vol. XXII, Abst. 3064).

**Pea.** The type Essex White is being selected to improve several characters.

2737 Rechenschaftsbericht und Vorträge der Festsitzung und wissenschaftlichen Tagung am 17. und 18. Oktober 1953 der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin. (**Progress report and lectures of the meeting and scientific conference on 17 and 18 October 1953 of the German Academy of Agricultural Sciences, Berlin**) : 1953 : Pp. 170.

Stubbe, H. *Aufgaben, Probleme und Ziele der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin (1951-1953)*. [*Tasks, problems and objectives of the German Academy of Agricultural Sciences in Berlin (1951-1953)*]. (pp. 11-35).

Included in this report is a short account of the

activities of plant breeding stations in Eastern Germany. At Bernberg, a monocious hemp has been developed. At Kleinwanzleben, photo-thermic treatment has resulted in the shortening of the vegetative cycle of many plants and in earlier flowering; this should prove of value in the breeding of biennial crops such as sugar beet. At Gross-Lüsewitz, a number of new virus-resistant potato strains have been obtained. By crossing commercial varieties with wild species, hybrids with a high degree of resistance to nematodes have been developed. Polyloid strains of red clover, Alsike and serradella have been tested. At Hadmersleben, strains of sweet white lupin suitable for human consumption have been bred.

Becker, G. *Problematik der Pflanzenzüchtung*. (*Problems of plant breeding*). (pp. 38-59).

This lecture, presented on the occasion of the second anniversary of the founding of the German Academy of Agricultural Sciences, Berlin, gives a general account of progress achieved since Darwin in our comprehension of the evolutionary process and illustrates the relationship between evolutionary theory, genetics and practical breeding. It is pointed out that in many respects our theoretical knowledge lags behind, and in some respects diverges from, our practical experiences. The future possibilities realizable by mankind through the study and practical application of genetics are depicted.

2738 Catalogue des variétés de blé, avoine, orge, maïs, pomme de terre, topinambour, soya, luzerne, lin cultivées en France. (**Catalogue of the varieties of wheat, oats, barley, maize, potato, Jerusalem artichoke, soya bean, lucerne and flax cultivated in France**).

Com. tech. perm. Sélection Plantes cultivées 1951 : Pp. 23.

Varieties of the above crops are listed, together with the name of the breeder or breeding station and the date on which each variety was authorized (cf. *PBA*, Vol. XVII, Abst. 142).

2739 GLUSHCHENKO, I. Y. [GLUŠČENKO, I. E.] **Biology in the service of the people.** Soviet News 1954 : No. 2938 : 7-8.

A brief review of Soviet plant breeding achievements, based on the theories of Mičurin and Lysenko, is presented, special attention being given to cases where the region of adaptation of such crops as peaches, tea and maize has been appreciably extended.

- 2740 PEĪVE, JA. V. [PEIVE, J.]  
(**Scientific research in agriculture in the Latvian SSR**).  
Zemledēlie (Agriculture) 1954 : No. 2 :  
17-28. [Russian].

**Cereals.** The new winter wheats Priekuli 481, Priekuli 118 and 22625, which combine high yield with hardiness and resistance to lodging, are described. Priekuli 22625 is also resistant to rust. A Latvian wheat, Kursas, and Cicin's hybrids 1 and 599 have yielded well in recent trials. A new spring wheat, Priekuli 260, has shown resistance to rust, smut and lodging. The barley Kombainer [Combine], bred at the Stendskaja station, proved resistant to smut and lodging and yielded 42.4 c. per ha.

**Potatoes.** New varieties bred for high yield include the midseason variety 3797, which shows resistance to *Phytophthora*, and the late form, Zile, which yields 37 tons per ha.

- 2741 PUHALSKIĪ, A. V.  
(**All scientific achievements should aid production**).  
Zemledēlie (Agriculture) 1954 : No. 3 :  
89-97. [Russian].

A further account of Mičurinite crop breeding at Odessa (cf. Abst. 911) is given. The section dealing with cereals has been expanded to include the following new data.

**Wheat.** New winter varieties still under trial include 164/48, which outyields Odessa 3 and Odessa 12. Large-grained, hard spring wheats showing resistance to lodging and fungous diseases have been developed. Several of them are earlier and more productive than Melanopus 37.

**Maize.** The vigour of hybrids such as Dnepropetrovsk x Gruševskaja Odesskaja [Odessa Gruševskaja] has been intensified by adding to the pollen of the male parent pollen of other varieties. In the above cross the increase in yield amounted to 3.5 c. per ha. Inbreeding is rejected in favour of multiple hybridization. (Čakvinskaja Žemčužina [Čakva Pearl] x Voronež 76) x Harjkov 23 is referred to as an example of a high-yielding multiple hybrid.

**Barley.** The new spring varieties Nutans 1/1 and Medicum 2/5, which yield 2.2-4 c. per ha. more than the standards, are being tested.

**Setaria.** A yellow-grained variety, Odessa, which outyields the local red-grained types, has been selected from material introduced from China.

- 2742 MARINIČ, P.  
(**High-yielding varieties for collective farms**).  
Kolhoz. Proizvod. (Collect. Fm. Prod.)  
1954 : No. 4 : 45-46. [Russian].

This list of recent standards of economic plants includes productive varieties of buckwheat, millet, lentils and peas, in addition to the cereals described below.

**Wheat.** Detailed particulars are given of winter wheats that outyield previous standards in several Russian and Ukrainian provinces. All of them produce large grain with good baking properties and many are hardy or show resistance to drought, lodging and rust. The new standards of hard and soft spring wheats are interesting for their high yields and good quality grain. Some show resistance to lodging, shedding and diseases, notably loose smut. Narodnaja [People's] and Krasnokutka [Krasnyi Kut] are suitable for macaroni making.

**Oats.** Orel [Eagle], noted for its productivity, large grain and resistance to lodging and shedding, and Soviet, possessing similar properties, combined with resistance to crown rust, have been made standards in several new districts.

**Rye.** The new large-grained White Russian varieties Benjakonskaja and Partizanskaja [Partisan] are resistant to lodging and yield 1.6-5 c. more grain than Novozybkovskaja 4. Volžanka [Volga], described as productive, hardy and resistant to drought and lodging, has been made a standard in two new provinces and Harjkovskaja 194 [Harjkov 194], possessing similar properties, in several new districts.

**Maize.** Mention is made of new high-yielding intervarietal hybrids, single crosses and the top crosses VIR 42 and VIR 25, originating from the Institute of Plant Industry. VIR 42 shows resistance to blister smut and lodging and yields 6-12 c. more kernels per ha. than the existing varieties and hybrids. VIR 25 outyields the productive hybrids Uspeh [Success] and Harjkovskii [Harjkov].

- 2743 ÅKERMANN, Å.  
Aktuella problem och ökade resurser inom den svenska växtförädlingen.  
(**Topical problems and increased resources in Swedish plant breeding**).  
Iva 1952 : 23 : 2-7.

Confining his remarks to field crops the speaker, in an address to the Swedish Academy of Engineering, briefly outlined the advances that have followed and may in future follow the vigorous development of plant breeding in



Sweden. A detailed account is given of the financial support and the buildings and equipment now provided for the promotion of the science and practice of plant breeding at the institute of the Swedish Seed Association at Svalöf.

- 2744 Berättelse över verksamheten vid statens skogsforskningsinstitut under perioden 1946-1952 jämte förslag till arbetsprogram för den kommande femårsperioden. (**Report on the work of the State Research Institute for Forestry during the period 1946-52, with proposals for the research programme for the next five years**). Medd. SkogsforsknInst. Stockh. 1953 (1954) : 43 : No. 6 : 1-79.

The Genetics Division of the above Institute in Sweden has contributed an account of the following work:—

In a study of the reaction between the genotype and its environment in forest trees, observations are being collected in a number of stands throughout Sweden on the growth and the stem and crown characteristics of a series of plus and minus variants. Seed and embryo development under conditions of (1) open pollination, (2) crossing within the stand, (3) provenance crosses, i.e. crossing between trees of different stands, (4) inbreeding, and (5) interspecific hybridization will also be investigated.

Experiments during 1948-52 on 15 plus and 13 minus trees indicate that (a) cone size (i.e. length) is a direct expression of the maternal genotype and affected only to some extent by other factors; (b) seed yield in some cases was higher after hybridization than after open pollination or inbreeding; and (c) certain minus and plus trees are cross pollinators that do not require or allow of inbreeding.

On inbreeding, as a rule the vitality of the seed is reduced as well as the amount of seed produced.

The progeny trials in a new series of provenance tests have been used also to investigate the incidence of lethal or semilethal factors, e.g. chlorophyll mutations. In nursery material, representing 1,012,000 trees from 23 stands, the total of such mutants was 0.14%; and in some stands the incidence was 50-100 times higher. Self fertilization may in some cases be responsible for such high frequencies.

Inbreeding in the progeny of some selected plus and minus trees resulted in Mendelian segregation for chlorophyll mutations; under conditions of open pollination such mutants were much fewer, and on hybridization altogether absent.

Population analyses are being continued as a contribution to the study of species formation. The effectiveness of different kinds of irradiation and the mechanism of induced mutation are other subjects for investigation. Bud mutation and the assimilation and transport of nutrients in genetically different material of poplars, spruce and pine are being investigated by the use of radioactive isotopes.

In studies of quality and productivity carried out on experimental plantations of spruce, some central European races, tested at three stations, have proved superior to the Swedish standard races, and the most vigorous of them are being selected for type and fineness of branching.

Extensive provenance studies are being continued.

- 2745 ÅKERBERG, E.  
Förädlingsarbeten vid Utsädesföreningens Ultunafilial och därvid uppnådda resultat. (**Breeding operations at the Ultuna Branch Station of the Seed Association and the results obtained**). LantbrVeckan 1953 : 190-212.

In continuance of the previous survey of the work of the Ultuna Station (cf. *PBA*, Vol. XVIII, Absts. 1331, 1359 and 1361), this address to the Swedish Seed Association covers the period 1947-53 and deals with the cultivation and breeding of the crops set out below. In recent years collaboration between the Ultuna and Orebrö stations and other experimental farms in various places has been established with a view to producing varieties that will combine improvement in yield and other agricultural characteristics with adaptation or tolerance to a particular locality or type of environment.

**Wheat.** In attempts to improve on the winter variety Odin some promising lines were obtained from Odin x Eroica and Odin x Virtus; unfortunately the straw of the latter hybrid is mostly too weak and repeated back crossing may be necessary, as has usually also been the case in crosses made with land wheats to improve reliability of yield, and in particular winter hardiness in autumn wheat.

**Oats.** The breeding of black oats for central Sweden and the efforts to improve Stormogul II [Great Mogul II] and Engelbrekt II, especially in quality, are mentioned. It has not been possible to combine the specific black oat characteristics of Stormogul II with any appreciable improvement in quality, but a good substitute for Engelbrekt II has been bred, namely U01590 (Stormogul II x Extra

Klock), which in yield at least equals Engelbrekt II and surpasses Extra Klock, while its husk percentage is as low as in white oats and much lower than in Extra Klock. U01590 should be able to replace both Engelbrekt II and Extra Klock.

White oat varieties better able to compete with black oats seem likely to be developed, and some interesting white oat lines, derived from crosses of Seger [Victory] with certain land varieties and specially suited for the eastern part of central Sweden, have been received for testing.

**Autumn rye.** Tetraploid rye has proved of much interest but needs to be further adapted to the special climate of the area.

**Barley.** Some breeding of barleys for special purposes, e.g. for growing on bog land, is included in the cereal programme.

**Herbage plants.** Breeding and selection from Ultuna red clover has resulted in the production of two strains, the tetraploid U036 and the diploid U056, combining winter hardiness and resistance to drought and rot with the nematode resistance of Merkur, and well adapted for satisfactory pollination and flower production. Seed production in clover has also been intensively studied.

Other work on red clover recorded by Bingefors and by Lesins has been summarized from time to time in *Plant Breeding Abstracts*.

Lucerne breeding has already been reviewed (cf. Abst. 1173).

**Potato and root crops.** Work has consisted mainly in testing varieties and strains from the Plant Breeding Division of the Svalöf Institute. Some selection of root crops has been begun.

**Hemp.** Strain trials indicate the possibilities of hemp for the Ultuna region.

**Oil crops.** Breeding of winter turnip rape must be continued on a larger scale and extended to include hybridization.

**Legumes.** Among the peas, bred since 1947, mention is made of 03521 (03101 x Ambrosia II), which is as early as Torsdags III [Thursday III] and has outyielded it and Kloster [Cloister] by 12%; it is being multiplied. The field pea U05801 (Hero x Artturi) is notable for its good yield, its early ripening, i.e. 4 days before Hero, and its 1000 seed weight, which is 15–20 g. lower than the relatively small-seeded Hero.

Other pea-breeding problems receiving attention are (1) regional adaptation in peas for processing and forage peas; (2) quality in peas for processing; and (3) output of green forage in peas for fodder; in this last connexion, crosses with varieties having a specially high proportion of

straw have been made. New vetches include Svalöfs Stjärn [Svalöf Star] (cf. Abst. 2552) bred at the Skara station, and the variety U02261 from Ultuna. So far breeding for higher seed yield has been the main aim; more attention will be paid later to yield of green matter.

A small-seeded, high yielding, horse bean, U01, bred by selection from commercial seed, is now on sale (cf. Abst. 2552).

During 1950–51, detailed morphological descriptions of lines from a varied collection of horse beans from Finland, England, Abyssinia and Germany were drawn up, and subsequent study showed great variation in reproductive, vegetative and biological characteristics. Of special interest are the early and small-seeded lines, in contrast to late and large-seeded varieties grown at present. Many crosses between the best lines have now been made and effective isolation of selected lines is being investigated.

2746 NILSSON-LEISSNER, G.  
Nya originalsorter och stammar. (New Original varieties and strains).  
Lantmannen, Stockholm 1954 : 38 :  
p. 519.

The Swedish Board for Original Seed has passed the following varieties and strains for certification as approved Original seed.

**Oats.** Svalöf Nip (Å01600) is an early, high-yielding black oat intended to replace Orion III and Guldregn II [Golden Rain II] in central and northern Norrland, where it has outyielded Same.

**Rye.** The well known Original Petkus II, also sold in Sweden formerly by the W. Weibull Co., is now recognized as an Original variety.

**Timothy.** Svalöf Bottnia II (L0841), a selection from Bottnia, is specially intended for upper Norrland, where its resistance to *Sclerotinia borealis* is an advantage. It resembles the parent strain but, under more exacting conditions, gives a higher yield.

**Alsike clover.** Intended only for cultivation in Norrland, Svalöfs Kurir [Svalöf Courier], obtained by selection from a strain from Brynge, Ångermanland, is of the Norrland type, hardy and persistent, with a long dormant period. Its yield of green forage in Norrland exceeds that of all other strains compared with it, in the second and third year, though not in the first year ley.

**Turnip rape.** Svalöf winter turnip rape Rapido II (Sv51/23) is to replace Rapido from which it is derived and which it has surpassed in seed production by 8%, in oil content by



about 0.4%, and in the strength of its stem; in winter hardiness and time of ripening it approximates to the parent variety.

**Radish.** Hammenhög Delikat OJO/52 [Delicate OJO/52] is oval-cylindrical in shape with a fine red colour and a tapering white tip. It is early and shows little tendency to sponginess.

**Peas.** The Svalöf grey pea Nola II (Å05323) will replace its sister variety Nola and, in upper and inner Norrland also Vesta. It is earlier and less luxuriant than Nola, which it surpasses in yield.

**Beans.** Weibull's Stella II (4392) is high yielding, with large thin-skinned seeds and is primarily intended to replace Stella.

2747 ELIASSEN, S.

Nya utsädesorter för våren. (New varieties for spring sowing).  
Lantmannen, Stockholm 1954 : 38 : 227-28.

The procedure followed in Sweden in testing and certifying new strains and varieties of crop plants is explained. Examples cited of newly approved cereals, peas, vetches, root crops, meadow grasses, potatoes and oil crops include: the Svalöf spring wheat Drott [King] which can replace Kärn II where the latter is too late in ripening; the Danish Pajbjerg variety of nematode-resistant barley, Drost, obtainable from a Norrköping firm under the name of Kungskorn [King's barley]; the Svalöf oats Seger II [Victory II] and Extra Klock II [Extra Bell II], which are expected to be on the market next season; the Svalöf field pea Bello; the new high yielding strain of perennial ryegrass, Delta from Hammenhög; the new Svalöf strain of smooth-stalked meadow grass, Atlas, which will be released next year; the Weibullsholm turnip Immuna III, which is more resistant to club root than previous strains and equals Bortfelder in yield on uninfected soil; the Barres mangel Kofor from Hammenhög; and the winter turnip rape Rapido II.

Other recently bred varieties, already mentioned in *Plant Breeding Abstracts*, are also listed.

2748 TÖRNQVIST, G. I.

Om verksamheten vid Sveriges Utsädesförenings Övre-Norrlandsfilial 1937-1952. (On the work of the Övre Norrland Branch Station of the Swedish Seed Association, 1937-52).

LantbrVeckan 1953 : 213-19.

This review covers the work of the above station since 1937 (cf. *PBA*, Vol. XVI, Abst. 1584 and Vol. XX, Abst. 7).

**Cereals.** In spite of a study of material from

numerous crosses and from land varieties, the black oat Same still remains the best for the region; but a line from the Finnish Övertorneå land oat appears promising.

No early white oat has been obtained at the Övre Norrland station, and the Norwegian variety Melöj, though early enough, is not of any great value otherwise.

One aim in autumn rye breeding has been to combine the resistance of Norbotten land rye to the various fungous overwintering diseases with the higher yield of the improved varieties. It is also hoped that by selection of Kungs II [King's II] a variety suitable for the extreme north of Norrland may be evolved.

Some tetraploid lines of Stål [Steel] and Toivo seem very promising.

The breeding material of 6-rowed barley comprises selections from land barleys from localities in Gällivare and from crosses. From a land barley from Dokkas, two extremely early lines L35/167 and L37/179 have been obtained. The line L31/163 from Vega x 14/39 (from a barley from Vuollerim) has equalled Edda on the average and has larger grain and is two days earlier, but the straw is as weak as that of Vega. X-irradiated plants of this line are now undergoing selection, while other X-irradiated material from L35/167 is also being studied; some of the mutants appear highly promising.

**Herbage plants.** Special attention has been given to grazing types, and the meadow fescue Bottnia II and the timothy L0841 from Bottnia material, formerly worked on by A. Ulander, have been obtained. The latter variety has so far given the highest yield in the station trials and has shown itself of value as far south as Värmland.

In collaboration with the Agricultural Society, comparative trials have been conducted of local strains of red clover from Norbotten; the Kusträsk and Brukte strains seem to be the best for Övre Norrland. Since 1950, red clover research has been directed towards tetraploid types, some of Norbotten origin.

**Turnips.** Östersundom strains at the station are good and seed production from plants with large roots has been very good even in unfavourable weather.

In recent experiments, diploid varieties have been surpassed by tetraploid types, especially Sirius, which in 1948 yielded 112 tons of roots and more than 9 tons of dry matter per ha.

**Potato.** Potato breeding began in 1945 after material from various localities had been identified.

Some potato trials may yield varieties of practical importance.

**Legumes.** Selection of peas for human and animal consumption has been in progress since 1938, but, as types early enough for years with moderately good weather have not yet been obtained, in 1948 A. Hain carried out a large series of crosses between Extra Rapid on the one hand and three of the earliest yellow pea lines of the station as well as some early Finnish lines on the other.

2749 VESTERGAARD, E.  
Abed Planteavlstation. (**Abed Plant Breeding Station**).  
Beretn. Planteavl. Loll.-Falster 1952 (1953) : 5-14.

The current report (cf. *PBA*, Vol. XXIII, Abst. 208) from this station contains the following:—

**Wheat.** Details are given of the performances during 1947-51 of Danish and Swedish bred wheats at various experimental stations in Denmark. The varieties Alba and Nord Desprez [Desprez North], tested in 1950 and 1951 at only three stations, outyielded Jubilé [Jubilee] and are probably nearly as winter hardy.

The results of the official variety trials during 1947-51 have already been reviewed (cf. *PBA*, Vol. XXIII, Abst. 2601).

With the object of combining hardiness and yield, crosses of Scandinavian varieties with French or Belgian wheats have been made.

In tests of Abed breeding material from various crosses, Abed 8-41, a 1948 selection from the population Eroica x Joncquois, and Abed 8-53 (Abed 32 x Jubilé), which outyielded all its competitors in 1952, have now been entered in the government preliminary trials.

The newer breeding material includes populations of Alba x Joncquois, Hansa x Eroica, Joncquois x Virtus x Forus, Jubilé x Forus, Konge II [King II] x Eroica, Joncquois x 9293, Forus x Joncquois and 9293 x Forus.

**Oats.** The performance of the variety Abed 6-36 (Minor x Abed 30) in various trials continues to be promising.

**Barley.** In addition to the trials of Danish and Swedish barleys mentioned in last year's report, experiments were carried out on varietal differences in the response to 300 and 500 kg. of calcium nitrate per ha.

Breeding operations and trials were continued. Mildew-resistant varieties gave the highest yields and among the newer barleys the mildew-free selections of Balder x Weihestephan did particularly well.

Tabulated results for 1950-52 show the very stiff-strawed lines Abed 7-38 (Abed Archer x

Kenia) and Abed 8-9 (Abed 317 x Isaria) to have given consistently high yields.

2750 Pajbjergfondens Forsøgs- og Forædlingsarbejde 1953. (**Breeding operations of the Pajbjerg Foundation in 1953**) : Pp. 39.

This progress report (cf. Abst. 1716) includes the following information:—

**Wheat.** The new winter wheat 63/157 from the cross Panser [Cuirass] x Skandia is very winter hardy, early ripening and uniform, while approximately equal to Eroica in yield. T230, formerly called Konge III [King III] and derived from a cross of Konge II and Little Tich, has short, stiff straw, almost equals Konge II in yield, and is winter hardy.

Three lines of spring wheat 85/17, 85/11 and 85/31 have very short and stiff straw and somewhat resemble winter wheat in appearance; the first has been retained for official testing.

**Oats.** In comparative trials during 1947-53, Pajbjerg Rex (now on the Swedish and Danish markets) and Pajbjerg Regent outyielded the Svalöf variety Stål [Steel]. In other experiments with two new lines of Rex and three of Regent, all the lines except one seemed as productive as their respective parent varieties; owing probably to superior strength of straw, the line Rex 103 and Regent exceeded the original Rex A in yield of grain.

**Barley.** The breeding material comprises some very stiff-strawed lines from X-irradiated 2-rowed barley and from hybridization of 6-rowed and 2-rowed barley combining a hitherto unknown degree of stiffness of straw with good yielding capacity.

Drost [King], which combines high yield with resistance to *Ustilago nuda* and exceptionally good resistance to *Heterodera major*, should be on the market by 1954; it has been classed as equal to Carlsberg in malting tests and its protein content is very low.

**Herbage plants.** Though work continues on the breeding of various grasses and legumes, the present report deals mainly with red clover, of which Swedish local strains have been found to be most suitable for strain building, in which the main aims are high yield, winter hardiness and resistance to diseases including *Sclerotinia trifoliorum*.

Results of yield trials of Danish and other red clovers during 1949-53 at various research stations suggest that, provided the strains tested are of the same type and similar as regards earliness and also dry when cut, the yield of green forage may be taken as a measure of the yield of dry matter.



Colchicine-treated red clover seedlings from crosses of Pajbjerg II with Östra Karaby, Wambåsa and Weibull's Resistentia have yielded some tetraploid plants. In general, the 1000 seed weight of the tetraploids is considerably higher than in diploid clover, but the yield of seed per tetraploid family varies from quite good to nil. In a small preliminary yield trial in which relatively poorly developed waste seed collected during threshing was used, the yield of green matter from Tetraploid Rodkløver [Tetraploid Red Clover] was at least equal to that from the best diploids.

Three white clover strains are being tested in trials at the government experimental stations.

**Lupin.** Numerous lines from various crosses were raised in the greenhouse for selection.

**Beets.** Breeding material included (a) diploid strains, (b) numerous tetraploid families of the most important of the diploid strains, and (c) many hybrids between diploid and tetraploid beets. So far, the tetraploids do not appear to give higher yields, but some of the triploid hybrids do as compared with existing strains.

2751 CHAVANCY, A., LANFRANCHI, J. & GUINARD, A.

Compte rendu des travaux du Centre d'Expérimentation Agronomique de Blao en 1950-1951-1952. (Report on the activities of the Blao Agricultural Experiment Centre in 1950, 1951 and 1952).

Arch. Rech. agron. pastor. Viêt-Nam 1953 : No. 19 : Pp. 186.

The results of variety trials of tea, coffee, tung, rice, pepper and ramie are included in this report of progress achieved at the Blao Station in reestablishing crop collections as material for future breeding (cf. *PBA*, Vol. XXIII, Abst. 174).

2752 HARDY, R.

L'activité de la station de Kiyaka. (The activities of the Kiyaka station). Bull. INEAC 1954 : 3 : 1-36.

An account of recent introductions and trials of varieties of buckwheat, rice, sweet potato, cassava, yam, tobacco, sunflower, groundnut, banana and French bean is included in this report of the work of the Experimental Station at Kiyaka, Belgian Congo.

**Maize.** The local variety Kahila has proved superior in yield to all varieties introduced from other parts of the Belgian Congo or from abroad.

**Pennisetum.** Data on mass and pedigree selections of *P. typhoides* are presented. Future aims

in breeding will include the production of synthetic lines.

**Sorghum.** The local variety Urusongii II out-yielded all other varieties.

**Soya bean.** The introduction Java 3334 gave the highest yields in variety trials.

2753 Annual Report of the East African Agriculture and Forestry Research Organisation for 1953 : Pp. 95.

**Maize.** Tests have shown 10 lines obtained from Mexico and Colombia to be resistant to *Puccinia polysora*; in some cases resistance is due to hypersensitivity. It has been shown that the seedling resistance of Central American varieties can be incorporated into local types, all of which are susceptible to *P. polysora*. Selections of the native variety Katumbili combined tolerance of the disease with agronomically desirable characters. Evaluation of East African varieties and tests for resistance to streak disease are being carried out.

**Cassava.** Crosses involving ceara hybrids, tree cassava, *Manihot dichotoma* and *M. melanobasis* have been made to combine tuberous roots with disease resistance. Field and greenhouse tests for disease resistance have been conducted.

**Groundnut.** Attempts to produce tetraploid plants in *Arachis prostrata*, in order to facilitate hybridization between this species and the groundnut, have given promising results. Crosses of Natal Common with Mwitunde, Matavere and Nambiquare have shown the character dormant seed to be dominant to non-dormant; the nature of the testa is important in determining dormancy. Lower susceptibility to aphids resulted in Mwitunde showing more resistance to the rosette disease than Natal Common. Mwitunde and Kanyoma possess a high degree of resistance to *Cercospora personata* and *C. arachidicola*.

2754 Technical and Specialist Officers' Reports for the year 1951 of the Department of Agriculture, Tanganyika 1953 : Pp. 93.

In addition to the following investigations, varietal trials of wheat, sorghum, rice, cassava, sunflower, groundnut and soya bean are reported.

**Millet.** Bajiri AF<sub>3</sub> and Indian Long Headed gave the best yields in trials. In most varieties, yield was correlated with time to maturity.

**Sorghum.** The four best plants with corneous endosperms from the F<sub>2</sub> of BC27 x DD Shalu and Dobbs x DD Shalu were back-crossed to BC27 and Dobbs, respectively. Dobbs gave good yields and appeared to be more resistant

to *Striga* than other varieties tested. Crosses among the following varieties have been made to combine good storing quality with early maturity: Wiru, BC27, Dobbs, Martin, Oklahoma, Kifaru and DD Shallu. Panicle and vegetative characters, maturity and susceptibility to leaf diseases have been ascertained for 164 varieties.

**Cotton.** The best strains for breeding purposes have been obtained from 4/86, 5/57, 6/29, 6/318, 6/320 and 6/322. The selection of Ukiriguru strains resistant to bacterial blight has received special attention; Albar 49, Albar 51, Bar 7/8, B<sub>2</sub>B<sub>3</sub> and Stoneville 20 have shown considerable resistance to this disease. The varieties Uk 46, 48 and 51 are moderately resistant to the jassids and strains from 7/150 are being used to breed for increased resistance. The spinning qualities of Uk 46 and 48 have remained comparable to those of Mz561.

**Tobacco.** Ehlers and 219 were superior in quality to other varieties tested.

**Coffee.** Clones and seedlings from the same mother tree have so far given comparable yields. In clonal selection trials, KP423, H66 and N197 gave good results.

**2755 Annual Report of the Department of Agriculture, Nyasaland Protectorate, for the years 1952 and 1953 (1954) : Pt. II : Pp. 34.**

In addition to the following investigations, varietal trials of wheat, maize, sorghum, *Eleusine*, rice, tobacco and sunflower are reported and brief notes on fruit varieties are given.

**Wheat.** Of five Kenya varieties, 360H showed most resistance to rust. In comparing the yields of early and late sown crops the varieties 360 and 184 gave the best yields, respectively.

**Maize.** Southern Rhodesian hybrids gave the best yields in replicated trials. In tests of introduced open-pollinated varieties, Potchefstroom Pearl yielded as well as local selections. Crosses using 64 inbreds as female parents and Namalenga and a Southern Rhodesian single cross as male parents were made and trials of the progeny have been held. Local strains were less susceptible than introduced varieties to *Puccinia polysora*.

**Cotton.** In trials comparing CLB, CL20 and East African varieties, CL20 gave the best yields at four of the six centres where the trials were held.

**Tung.** In the 10th year of the clone trials, 14, 10, M13 and M8 gave the best yields. The small umbrella-shaped type B trees, 14 and 10, gave superior yields at an early age but have

now reached maturity, while the type A trees, M13 and M8, are still giving increasing yields.

**2756 Progress Report of the Dominion Experimental Station, Beaverlodge, Alberta for 1948-1952 : Pp. 44.**

**Cereals.** Emphasis is being laid on the breeding of early varieties of wheat, oats and barley. Adaptability trials have shown Saunders, Victory and Olli to be the most suitable varieties of wheat, oats and barley, respectively, for cultivation in the Peace River region. The winter wheat Kharkov MC22 and the winter rye Dakold can also be grown in this area.

**Fruit and vegetables.** Trials of apple, plum, raspberry, currant, gooseberry and strawberry varieties are reported. Vegetable varieties that have given good results are listed. Pembina and Smoky, two strains of saskatoon of high quality, have been selected. Pembina has upright, vigorously growing bushes that give good yields. The large fruits have a sweet flavour with a sharp tang. The spreading, moderately tall bushes of Smoky produce large fruits having a very sweet flavour. Both strains have been propagated by seed without loss of quality.

**2757 THOMPSON, H. C.**

**Plant industry department semi-annual report, first semester 1953.**

Comun. Turrialba 1953 : No. 39 : Pp. 28. (Mimeographed).

An account of agricultural research at Turrialba, Costa Rica, is given.

**Maize.** Selection for general combining ability has been made. S<sub>1</sub> lines of I-451 showing resistance to lodging were tested in top-cross combinations.

**Rice.** A large number of varieties are being tested for resistance to *Helminthosporium oryzae*.

**Potato.** The varieties Ticanel, Rosanel and Güetar have been produced (cf. Abst. 3132).

**Coffee.** Rootstocks are being tested for resistance to coffee root mealy bug. New varieties have been introduced from Brazil and Puerto Rico.

**Tomato.** Hybridization of foreign commercial varieties with Turrialba lines and a local wild cherry tomato is being carried out. Manabucie and Southland are the best of 13 recently introduced varieties.

**Pea.** In tests of 12 varieties introduced from the USA, Progress 9 proved superior.

**2758 Report of the Federal Experiment Station in Puerto Rico 1953 : Pp. 28.**

In addition to the following research, the



breeding of kudzu, sweet potato and *Derris elliptica* is reported.

**Wheat.** Resistance to race 15B of rust, in investigations at St. Croix, Mexico and Beltsville, was found in a Kenya introduction and in selections from crosses between K58 or K117 A on the one hand and Newthatch, Mida or Pilot on the other; in Egypt Na 101 and its crosses with Timstein, and in selections from crosses of Frontana x Newthatch. Durum wheats Beladi 116 [Local 116], Tremez Molle, Tremez Preto, Tremez Rijo, Chapingo and Trigo Glutinoso [Glutinous wheat] showed promising resistance, though the last variety had 25% infection in Peru. Out of 64 (*Triticum* x *Agropyron*) x *Triticum* crosses 10 were free from race 15B.

**Forage grasses.** Progenies of three varieties of *Panicum maximum* were grown to observe the proportion of sexually reproducing offspring which occurred. Only 4.7, 2.6 and 1.3 per cent sexual plants were obtained, the variants differing in morphology and development from the normal apomictic type.

Chromosome numbers of the following species have been determined together with the chromosome association most frequently observed at first meiotic metaphase: *Andropogon brevifolius*,  $2n = 40$  ( $20_{II}$ ); *A. intermedius*,  $2n = 60$ ; *Hyparrhenia hirta*,  $2n = 40$  ( $2_{IV} + 16_{II}$ ); *H. rufa*,  $2n = 40$  ( $1_{IV} + 18_{II}$ ); *Sorghastrum setosum*,  $2n = 20$  ( $10_{II}$ ); *Paspalum virgatum*,  $2n = 40$  ( $20_{II}$ ); *P. secans*,  $2n = 40$  ( $3_{II} + 34_{I}$ ); *P. malacophyllum*,  $2n = 40$  ( $4_{IV} + 12_{II}$ ); *P. millegrana*,  $2n = 41$  ( $19_{II} + 1_{III}$ ); *P. macrophyllum*,  $2n = 60$  ( $30_{II}$ ); *P. laxum*,  $2n = 60$  ( $30_{II}$ ); *P. lividum*,  $2n = 70$  ( $9_{IV} + 3_{III} + 14_{II}$ ); *Pennisetum ciliare*,  $2n = 36$  ( $4_{IV} + 10_{II}$ ); and *Setaria geniculata*,  $2n = 36$  ( $18_{II}$ ).

**Vanilla.** *Vanilla planifolia* was crossed with *V. phaeantha* to obtain a commercial variety resistant to root rot. The hybrid pods were not of sufficiently good quality so back crosses to *V. planifolia* have been made.

**Indigofera.** Hot-water emasculation of flowers can be effected by immersion for 4-5 min. in water at 47-48°C.

**Coconut.** Comparisons are being made between the dwarf coconut and the variety commonly grown in Puerto Rico.

**Sweet corn.** Inbreds of USDA-34 showed good uniformity and vigour after six generations of selection for insect resistance, yield, vigour and normal flowering and had satisfactory resistance to *Heliothis armigera*.

2759 **Report of the Governing Body and the Principal's Report of the Imperial College of Tropical Agriculture, Trinidad, for 1952-53** (1954) : Pp. 40.

**Cacao.** Crosses between  $F_1$  inbreds of ICS 1 and ICS 45 have been carried out in breeding for resistance to witches' broom.

**Banana.** Cytogenetic studies of sterility and parthenocarpy among diploid male parents in *Musa acuminata* have continued.

2760 **Carnegie Institution of Washington.** Yearbook No. 52 : 1952-53 : Pp. 309.

*Department of Plant Biology*  
*Experimental taxonomy.* (pp. 169-82).

Clausen, J., Hiesey, W. M. & Nobs, M. A.  
*The Poa program.* (pp. 170-73).

The programme of evaluation of new apomictic interspecific hybrids is being considerably extended, in cooperation not only with the US Soil Conservation Service but also with state experiment stations, the US Bureau of Plant Industry and other agencies (cf. *PBA*, Vol. XXIII, Absts. 1605-6 and Vol. XXIV, Abst. 1142).

At Pullman, Wash., several  $F_2$  apomictic lines from *P. ampla* x *P. pratensis* have proved superior in leafiness and vigour to earlier lines from the same cross. Two constant  $F_2$  *P. scabrella* x *P. pratensis* hybrids have displayed outstandingly good winter hardiness, in contrast to other derivatives of this cross; their morphological characters suggest that they arose through fertilization of a sexual  $F_1$  hybrid by pollen of *P. pratensis* var. *alpigena*. Other promising apomictic lines include a *P. ampla* x *P. compressa* hybrid and an open-pollinated form combining the characteristics of *P. ampla*, *P. compressa* and *P. pratensis* var. *alpigena*.

Triplett, E. L. *Cytology of Poa hybrids.* (pp. 173-74).

Most of the  $F_1$  *P. arida* ( $2n = 63$ ) x *P. ampla* ( $2n = 56$ ) hybrids examined showed a range in chromosome number from  $2n = 88$  to  $2n = 92$ , indicating their origin from the union of unreduced ♀ gametes and reduced ♂ gametes.  $F_1$  hybrids of *P. scabrella* ♀ x *P. arachnifera* ( $2n = 56$ ) ♂ had  $2n = 69-75$ ; the chromosome number of  $F_1$  plants from *P. arachnifera* ( $2n = 56$ ) ♀ x *P. pratensis* ( $2n = 68$ ) varied from  $2n = 61$  to 65. Quadruple hybrids involving *P. arida*, *P. ampla*, *P. pratensis* var. *alpigena*, *P. pratensis* and *P. scabrella* in various combinations appear to be of practical value. Hybrids of *P. ampla*-*P. pratensis* var. *alpigena* x *P. scabrella*-*P. pratensis* were produced from

reduced gametes and had  $2n = 56$  to  $82$ , with peaks of frequency at  $2n = 62-64$  and  $71-73$ .

Grun, P. *Ultraviolet absorption spectra of isolated root-tip nuclei*. (pp. 178-79).

Applying ultraviolet microspectro-photometric methods of analysis to isolated nuclei from root tips of *Tradescantia*, the nuclei of cells undergoing mitosis and those of cells in adjacent nondividing tissue are being compared with respect to nucleic acid and protein contents. The work is being carried out at Stockholm, under T. O. Caspersson.

Department of Genetics. (pp. 205-48).

Demerec, M. et al. *Bacterial genetics*. (pp. 210-21).

Additional spontaneously mutating types, whose rate of mutation for biochemical deficiencies cannot be increased by treatment with X rays, ultraviolet or chemicals, have been detected. Mutagen stability is a property of certain genes rather than of particular strains and it is not related to the rate of spontaneous mutation.

Bacteria grown in shaken cultures proved to be much less sensitive to the mutagenic action of  $MnCl_2$  than bacteria grown in aerated cultures; this finding is in agreement with the earlier conclusion that the degree of mutagenic effectiveness of  $MnCl_2$  depends upon the physiological condition of the cells.

An analysis of induced reversions demonstrated a delayed effect among 55% of the nutritionally-deficient mutants studied and in all cases of mutation involving resistance to phage or streptomycin.

Exposure to  $15^\circ C$  reduced the frequency of spontaneous and induced mutation to resistance to phage T3. This temperature effect was different in ultraviolet-irradiated and  $MnCl_2$ -treated bacteria. Compared with a posttreatment temperature of  $37^\circ C$ , exposure to  $15^\circ C$  brought about a comparatively small reduction in the final number of ultraviolet-induced mutants but a much slower rate of appearance during the first five divisions. In  $MnCl_2$ -treated bacteria, posttreatment at  $15^\circ C$  resulted in a marked reduction in the final number of mutants but no change in the number per generation during the first five divisions.

Experiments on the genetic effects of thermal neutrons were initiated.

Visconti, N., Garen, A. & Symonds, N. *Genetic studies with bacteriophage T2*. (pp. 221-23).

The unity of the vegetative pool in phage-infected bacteria has been demonstrated (cf. Abst. 1693).

One type of unstable phage particle gives rise to sectorial plaques, containing unstable particles like the parent, and particles stable for  $r$ , the character of rapid lysis. The occurrence of such plaques is attributed to two loci. One locus,  $R$ , is the site of  $r$  mutations in the unstable particles. The other,  $u$ , determines the sectoring, under the conditions of an appropriate medium. The stock producing the sectorial plaques have the constitution  $R^+u$ . The locus  $R$  is linked with  $r_1$ , with a recombination frequency of 0.3%;  $R$  and  $u$  are linked with a recombination value of 2%. The sectoring of the  $R^+u$  plaques was due to selection, in agar but not in broth, in favour of the mutant  $Ru$ ; the role of  $u$  in this selection remains to be investigated.

Hershey, A. D., Hudis, J. D. & Chase, M. *Role of desoxyribose nucleic acid in bacteriophage infection*. (pp. 223-27).

Synthesis of nucleic acid forming the precursor of mature infective particles of bacteriophage occurred at times and rates consistent with the view that the nucleic acid contains the genetic determinants of the virus.

McClintock, B. *Mutation in maize*. (pp. 227-37).

*Ds*-initiated modifications (cf. Abst. 1953) of a particular locus were found to affect not only the action of the known gene immediately adjacent to *Ds* but also the action of genes located beyond it. The spread of the mutational change induced by alteration at the particular locus comprised a region of at least six cross-over units in length. The spread beyond this limit could not be determined because mutations adversely affecting gametic viability or growth capacity were involved. Mutations producing similar changes in phenotypic expression of known genes may arise from dissimilar types of modification, such dissimilarities being detected by differences in the viability of homozygote and heterozygote, in gametic viability, in cross-over frequencies in the vicinity of the altered genes and in the subsequent capacity for reverse mutation. Particular changes in the genetic constitution of the nuclei, whether originating from somatic or meiotic segregations, are responsible for controlling the occurrence of mutation at a number of mutable loci.

Kaufmann, B. P., McDonald, M. R., Bernstein, M. H., Borstel, R. C. von & Das, N. K. *Patterns of organization of cellular materials*. (pp. 238-48).

Investigations on root-tip cells of onion, lily and broad bean have shown that, according to



the experimental conditions, ribonuclease may behave as a narcotic, an agent producing mitotic and chromosomal abnormalities, or as a poison. The production of mitotic and chromosomal abnormalities is associated with the degradation of ribose nucleic acid; probably many of the cytological aberrations induced by chemical and physical agents are attributable to alterations in the ribonucleoprotein constituents of the chromosomes rather than to changes in deoxyribonucleic acids or deoxyribonucleoproteins.

In investigations on chromosome structure, the increased pyronin stainability of the chromosomes and cytoplasm of onion root-tip cells after treatment with trypsin either in aqueous solution or in the presence of electrolytes has been found to be a valid criterion of digestion by trypsin; nuclear and cellular degradation, however, rapidly follows in solutions containing electrolytes.

**2761 Progress of agricultural research in Indiana. Sixty-sixth Annual Report of the Director of the Purdue University Agricultural Experiment Station, for the year ending June 30, 1953 :** Pp. 148.

**Wheat.** Knox, a new early maturing variety of soft wheat, has been released. It is resistant to lodging, rust and mosaic and superior in yield and quality to Vigo, Seneca and Fairfield. The soft wheat strains CI 12557, 12750, 12798 and 12986 appear to be better than commercial varieties in yield and resistance to rust, smut, mosaic and Hessian fly. The resistance of Kawvale and PI94587 to new races of loose smut and Hessian fly respectively has been incorporated into commercial varieties.

**Oats.** A brief description of Dubois (cf. *PBA*, Vol. XXII, Abst. 1902) and Clintland (cf. Abst. 273) is given.

**Maize.** Breeding for disease resistance has been continued.

**Barley.** The identification of the chromosomes involved in nine interchanges has indicated that two of the seven recognized linkage groups may be on the same chromosome.

**Apple.** Of 250 apple trees immune to scab, lines from *Malus floribunda*, *M. prunifolia* and R 12740-7A produced the best fruit. Dalgo, Alexis and Bitter Crab are susceptible to race 2 of the scab fungus recently found in South Dakota, whilst R 12740-7A is less resistant to race 2 than to race 1.

**Tomato.** Male sterility was shown to be due

to single recessive genes in the seven mutants studied. When crossed with Pritchard, normal plants and male-sterile mutants of both Garden State and Rutgers produced hybrids which were similar to each other in yield.

**Soya bean.** Varieties resistant to *Diaporthe phaseolorum* under field conditions were susceptible when inoculated with the pathogen, thus suggesting that resistance is due to the prevention of initial infection.

**Sweet corn.** The white inbreds 81-1 and 471-Ub, selected for resistance to earworm, have been released for breeding purposes. Crosses to introduce into inbred lines resistance to *Helminthosporium turcicum* from B<sub>2</sub> and Minnesota have been made. A cytoplasmic factor for male sterility is being introduced into inbreds used as female parents in seed production.

**Popcorn.** An early maturing hybrid, P 202, has been released. The hybrid 23156, which was produced from crosses involving Baby Golden, gave the highest yields in trials.

**Mint.** The F<sub>1</sub> of crosses between Scotch spearmint and common spearmint were immune to rust. Seedlings of the cross *Mentha piperita* x *M. crispa* have shown resistance to *Verticillium* wilt.

**2762 Sixteenth Biennial Report of the Director of the Kansas Agricultural Experiment Station for the biennium July 1, 1950, to June 30, 1952 (1953) :** Pp. 106.

In addition to the following research, varietal trials of wheat, oats, maize, barley, sorghum, potato, sesame, apple, pear, peach, strawberry, grape, tomato and sweet corn are reported.

**Wheat.** Varieties Kiowa (cf. *PBA*, Vol. XXI, Abst. 2570) and Ponca (cf. *PBA*, Vol. XXII, Abst. 1096) have been released. Information obtained to date on test weight, earliness and plant height suggest that these characters may be determined in the early generations of breeding, having high heritability, while yield may not. On the basis of percentage of dry matter there was no significant difference in lignin content between hard and soft wheats. Chromosome studies of 46 wheat varieties and 8 crosses of late generations of *Agropyron* and different forms of wheat were made. Among the varieties only Sinvalochlo showed much irregularity. Amphidiploids were checked and a certain amount of irregular pairing found. Clarke Sel. 44-166, PI 74589 x Fulty-Mediterranean and Cornell CI 12372 were resistant to

foliar eyespot. Selections and hybrids have been found resistant to *Septoria tritici*. Good resistance to race 15B of stem rust has been found in F<sub>3</sub> lines of the cross Chinese *Agropyron elongatum* x Pawnee. South American wheats are being used for obtaining resistance to leaf rust. Selections from the cross (Med.-Hope x Pawnee) x (Oro-Illinois 1 x Comanche) show promising Hessian fly resistance.

**Oats.** Selection for earliness is taking place.

**Maize.** A full-season, yellow, double cross, K 1830, gave a good performance and has been recommended for Kansas. Data suggest that chromosomes 1 and 4 and possibly others carry genes affecting top firing. K 1859 has resistance to ear worm and maize leaf aphid. K 1861 has high resistance to maize leaf aphid and L 317 and K 155 have some resistance to European corn borer.

**Sorghum.** Ellis, Miloca and Texioca are good waxy types and White Collier is high in sugar content.

**Sudan grass.** K 3, which is superior to all commercial varieties for Kansas, has been approved for certification.

**Lucerne.** Resistance to *Pseudopeziza medicaginis* was found. Foundation Buffalo lucerne had the highest resistance to cold.

**Sweet clover.** Madrid is the variety most suited to the Hays region.

**Apple.** Resistance to fire blight was found in 22 rootstock varieties. Tests on frost resistance gave results similar to field observations made in 1947.

**Pinus.** *P. sylvestris*, *P. banksiana*, *P. strobus* and *P. virginiana* appeared immune to *Dothiostroma pini*.

**Tomato.** Ohio Globe WR gave the highest yields in soil infected with *Fusarium* wilt. Ohio Globe WR and Southland were resistant in *Fusarium* inoculation tests.

**Soya bean.** Perry was approved for distribution in Kansas.

2763 MENDIOLA, N. B.

**Progress and problems in crop improvement in the Philippines.**

Araneta J. Agric. 1954 : 1 : 15-26.

The author discusses (1) progress made in crop introduction and acclimatization, commenting upon current problems in this field; (2) the need for abacá varieties resistant to mosaic and coconut varieties resistant to cadang-cadang; (3) difficulties in producing adapted F<sub>1</sub> hybrid seed of maize; (4) the propagation and distribution of improved seeds and plants; and (5) varietal improvement in relation to soil and climatic conditions.

2764 I. Das Institut für Kulturpflanzenforschung 1943-1952. (**The Institute for Research on Crop Plants, 1943-1952**). Ber. Mitt. Inst. KulturpflForsch. Berlin 1953 : 1 : 7-52.

A comprehensive account of the history and aims of the above institute, founded at Gatersleben in 1943, is given, together with data on the flora, climate and soil structure of the surrounding district. Attempts are being made to extend the station collections of breeding material by expeditions abroad. The work of the Department of Genetics and Cytology includes research on maize and the Cucurbitaceae and experiments on vegetative hybridization and the induction of mutations in cultivated plants and in *Antirrhinum*. By rigorous selection, the Department of Forestry has improved the yield, and size and quality of fruit, of wild species of apple and pear.

2765 Lijst van proeven en proefbedrijven van rijkslandbouwconsulenten en andere instanties 1954. (**List of tests and experimental farms of national agricultural advisors and other authorities, 1954**).

Meded. LandbVoorlDienst, Wageningen 1954 : No. 69 : Pp. 116.

Tabulated data on the authorities concerned with agricultural trials in the Netherlands are provided, together with a four-page list of new varieties of cereals, rape, peas, beans, flax, poppy and potatoes undergoing field trials in 1954 and not included in the Netherlands list of approved varieties for the year (cf. p. 485).

2766 LAROSE, E.

Quarante années d'activité à la Station de Recherches de l'État, pour l'amélioration des plantes de grande culture, à Gembloux. (**Forty years' activity at the State Research Station for the improvement of crop plants, Gembloux**).

Rev. Agric., Brux. 1954 : 7 : 95-109.

A short history of the plant breeding station at Gembloux, Belgium, is given and mention made of new varieties of cereals and flax that have originated there.

2767 VAN HEUSDEN, W. C.

Het spuurwerk van het proefstation der Centrale Proefstationsvereniging. (**The pioneer work of the experiment station of the Central Association of Experiment Stations**).

Bergcultures 1954 : 23 : 246-55.

This popular account of the activities of the



Bogor Experiment Station, Indonesia, includes a short description of breeding work on rubber, tea, coffee and cacao.

- 2768 LAUMONT, P. & ERROUX, J.  
Remarques sur la technique de l'amélioration des plantes de grande culture suivie au Service de l'Expérimentation Agricole en Algérie. (**Remarks on the technique of improving crop plants followed in the Experimental Agricultural Service in Algeria**).  
Ann. Inst. agric. Algér. 1953 : 7 : No. 9 : Pp. 30.

This official directive lays down the methods to be adopted in varietal selection and testing at agricultural stations in Algeria.

- 2769 ÅKERMAN, Å.  
Försöksverksamheten och några aktuella kvalitetsfrågor. (**Research and some quality problems of immediate importance**).  
Sverig. Utsädesfören. Tidskr. 1954 : 11-25.

In this address, delivered to agricultural advisers and representatives of agricultural institutions in Sweden, the problems bearing on quality improvement of cereals, root crops, potatoes, oil plants and herbage grasses and legumes were discussed from diverse aspects, including manuring, ensilage and the economic background of crop production and animal husbandry in Sweden. The speaker stressed the need for better coordination of results of scientific research, for team work in investigations, and for stimulating the interest of local advisers and also of industries dependent on agricultural products in advances made in various fields of research, including plant breeding.

- 2770 Vingt-huitième liste descriptive des variétés de plantes de grande culture 1953. Variétés de céréales. (**Twenty-eighth descriptive list of varieties of crop plants, 1953. Cereal varieties**).  
Comm. Variétés Pl. grande Cult. Wageningen 1953 : Pp. 62.  
Variétés de lin. (**Flax varieties**).  
Ibid. 1953 : Pp. 14.  
Variétés de légumineuses à grains. (**Legume varieties grown for seed**).  
Ibid. 1953 : Pp. 36.

Each of these three small booklets consists of a translation into French of the relevant section of the Netherlands twenty-eighth descriptive

list of agricultural crop plants (cf. *PBA*, Vol. XXIII, p. 484).

- 2771 M., A.  
Schema di provvedimento legislativo per la concessione del "brevetto" per le novità vegetali. (**Scheme for the legislation providing for a patent for plant novelties**).  
Riv. Ortoflorofruttic. ital. 1954 : 38 : 118-20.

The provisions of the law for patenting the products of plant breeding, recently introduced in Italy, are outlined.

- 2772 NIJDAM, F. E.  
**Research on varieties on behalf of the registration.**  
Netherlands J. agric. Sci. 1954 : 2 : 88-97.

A general account of the procedure for licensing new varieties in the Netherlands is presented. In order to obtain the official certificate of registration, the new variety must be morphologically distinct from existing varieties and must have proved its agronomic value. Difficulties in registration and control likely to arise as the result of mutations in the new variety are indicated.

- 2773 Kontrollen över Allmänna Svenska Utsädesaktiebolagets försäljning av utsädesvaror. (**Control over the sales and seed products of the General Swedish Seed Company Ltd.**).  
Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : 2-4.

A new Swedish official system of total control, voluntarily adopted by the above company in regard to all seed (including Original seed) offered for sale by it, is described; and the functions of the Swedish National Central Seed Control Institute and the Swedish Seed Control Association in the enactment of the statutory regulations under the new agreement are explained.

- 2774 TSITSIN [CICIN], N.  
**Distant hybridization of plants.**  
Sci. & Cult. 1954 : 19 : 382-87, 428-32.  
After expounding Soviet views on distant hybridization, the author presents an account of work carried out in the USSR on annual and perennial derivatives of wheat-*Agropyron* and rye-*Agropyron* hybrids, hybridization of wheat, barley and rye with *Elymus* spp., use of forms of *Agropyron* spp. with branching ears to introduce this character into wheat, and vegetative hybridization between yellow acacia and herbaceous legumes and between *Cyphomandra* and other members of the Solanaceae.

- 2775 PORPÁCZY, A.  
Forschungsarbeiten über die Akklimatisa-  
tion in Ungarn. Theorie und Ergebnisse.  
(**Research on acclimatization in  
Hungary. Theory and results**).  
Acta agron. 1952 : 2 : 81-97.

An account of Mičurin's theories on the adapta-  
tion of species to a new environment is given;  
hybridization followed by selection offers the  
best possibilities for obtaining new types of  
kenaf, cotton, ramie and other crops adapted  
to cultivation in Hungary. Success has already  
been achieved in shattering the inheritance of  
rice, sorghum, soya bean and castor bean and  
thereby obtaining new varieties that yield well  
under Central European conditions.

- 2776 SIMMONDS, N. W.  
**Chromosome behaviour in some  
tropical plants.**  
Heredity 1954 : 8 : 139-46.

Chromosome numbers are reported for 87  
species, most of which are of economic signifi-  
cance. Notes are given on the meiotic behaviour  
of 28 species.

- 2777 NINOMIYA, T. & HINO, I.  
**Wide application of the "copper-  
sulphate reaction" method in various  
fields of scientific researches.**  
Yamaguchi Daigaku Nogakubu  
Gakujutsu Hokoku/Bull. Fac. Agric.  
Yamaguti Univ. 1951 : No. 2 : 13-22.

By heating material in a test tube with 1.5-  
2.0 c.c. of 1-2 N KOH, adding 2.5-4.0 c.c. of  
0.5% CuSO<sub>4</sub>, and then grading liquid and  
precipitate for colour after completion of the  
reaction in 1-2 hours, it proved possible to  
distinguish ♂ from ♀ plants in diecious species,  
to identify species and varieties of a single  
species, and to detect physiological differences  
such as those between normal and variegated  
leaves.

- 2778 **Proceedings of the Seventh Annual  
Meeting of the Southern Weed  
Conference, January 11, 12, 13,  
1954, Memphis, Tennessee** : Pp. 360.  
(Mimeographed).

Normand, W. C. *A study of the interac-  
tions of cotton varieties and pre-  
emergence herbicides.* (pp. 129-33).

Experiments at the Louisiana Agricultural  
Experiment Station, Baton Rouge, suggest that  
varietal differences may be expected from treat-  
ments with the dinitro compound DNOSBP

but probably not from treatments with 3-Chloro  
IPC, CMU or Weed Killer "D."

Porter, W. K. (Jun.). *On the mechanism  
of sensitivity; auxin relations of inbred  
corn lines.* (pp. 219-25).

The results of investigations on coleoptiles of  
two maize inbreds, W-148 and W-8, resistant  
and susceptible to 2,4-D, respectively, indicated  
that the endogenous auxin content controlled  
growth in the presence or absence of externally  
applied indoleacetic acid, W-148 possessing a  
higher concentration of endogenous auxin than  
W-8. Root growth did not appear to be  
related to endogenous auxin content; the roots  
of W-148, characterized by a higher auxin  
content than those of W-8, were stimulated by  
indoleacetic acid but those of W-8 were  
inhibited.

- 2779 MANSFELD, R.  
Zur allgemeinen Systematik der Kultur-  
pflanzen I. (**On the general systematics  
of crop plants I.**).  
Ber. Mitt. Inst. KulturpflForsch. Berlin  
1953 : 1 : 138-55.

The importance to the breeder of a compact  
and constantly revised system of classification  
is emphasized and it is suggested that, in view  
of the diversity of forms in cultivated plants,  
these should be classified independently of wild  
plants. The terms specioïd, subspecioïd, convar,  
provar, nidus and cultivar are proposed for the  
classification of cultivated plants, to correspond  
respectively to the terms species, subspecies,  
group of botanical varieties, botanical variety,  
group of cultivated varieties, and cultivated  
variety, in present use.

- 2780 HAUDRICOURT, A.-G. & HÉDIN, L.  
Recherches récentes sur l'histoire des  
plantes cultivées. (**Recent researches  
on the history of cultivated plants**).  
Rev. Bot. appl. 1953 : 33 : 537-45.

A survey of the literature on the subject is  
presented and certain aspects of I. H. Burkill's  
work on the habits of man and the origins of the  
cultivated plants of the Old World (cf. *PBA*,  
Vol. XXIII, Abst. 1824) are subjected to a  
critical analysis.

- 2781 NILSSON-LEISSNER, G.  
**The need for uniform nomenclature  
in designating various classes of  
certified seed.**  
Proc. int. Seed Test. Ass. 1953 : 18 :  
152-60.

The need for a uniform, internationally recog-  
nized system for the classification of certified



seed is urged to avoid confusion arising from the promiscuous use of such terms as *élite*, stock seed, mother seed, foundation seed and original seed. The exact translation of these terms into foreign languages should also be agreed on an international basis. Reference is made to the resolution on this subject passed at the Sixth International Grassland Conference held in Pennsylvania in 1952 (cf. Abst. 1142).

- 2782 HERRMANN, F. -J.  
Feldberegnung und Pflanzenzüchtung.  
(**Overhead irrigation and plant breeding**).

Mitt. dtsh. LandwGes. 1954 : 69 : 459-6.

The writer predicts that overhead irrigation will play an increasingly important role in agriculture and stresses the importance of breeding new varieties capable of exploiting conditions of optimal moisture. The need for drought-resistant varieties will diminish, thus enabling greater emphasis to be placed upon breeding for higher yields. Spraying also reduces damage by frost, with the result that crops such as tomatoes can be planted out earlier; the significance of this for the breeder is discussed briefly.

- 2783 NIELSON, R. F.  
**Panguitch Farm. Studies to improve farm practices in areas of high altitude.**

Fm Home Sci. 1954 : 15 : No. 1 : 10-12.

The barley variety Velvon, the lucerne varieties Ranger and Ladak, the sweet clover variety Spanish, the red clover varieties Alaskan and Wisconsin Mildew Resistant, and the Alsike clover strains 24296 and 24302 have produced high yields at the Panguitch Experiment Station, Utah, and appear suitable for cultivation at high altitudes.

- 2784 **Guide to varieties of field and vegetable crops under trial, observation and propagation.**

Nat. Inst. agric. Bot. 1954 : Pp. 78.

Part I provides a guide to 1954 trials at the headquarters of the National Institute of Agricultural Botany, Cambridge, England. Part 2 gives information on the crop varieties under seed multiplication at Hill Farm, Lolworth, near Cambridge. Part 3 summarizes the trials and observation plots at the various regional centres in Great Britain. Part 4 describes other work undertaken by the institute in multiplying stock seed and virus-tested potatoes. Part 5 lists the origins and pedigrees of the cereal varieties under trial.

- 2785 HANSEN, H. H. H.  
Lokale forsøg og andre planteavlssarbejder.  
(**Local trials and other work of plant cultivation**).

Beretn. Planteavl. Loll.-Falster 1952 (1953) : 15-104.

This review includes detailed reports showing the results of manurial experiments and variety and strain trials of winter wheat; hybrid maize; clover; lucerne; Danish oats, including Pajbjerg Rex (cf. *PBA*, Vol. XXIII, Abst. 208) and Palu; and Danish and Swedish barleys (cf. *PBA*, Vol. XXIII, Abst. 198).

- 2786 Beproeving van nieuwe rassen. II.  
(**Testing of new varieties. II.**)

Meded. Ned. Alg. Keuringsdienst Landbouwzaden Aardappelpootgoed 1954 : 11 : p. 13.

Brief data on time of maturity, quality and resistance to disease of several new varieties of potato, flax and opium poppy which have recently undergone trials in the Netherlands are given.

- 2787 Station de Recherches de l'État pour l'Amélioration des Plantes de Grande Culture, à Gembloux. (**State Research Station for the Improvement of Crop Plants, Gembloux**).

Rev. Agric., Brux. 1953 : 6 : 1700-35.

The results of the 1951-52 series of variety trials of cereals, flax, *Vicia sativa* and tobacco are presented. Of the winter wheats, Ministre [Minister] gave the highest yields; Panther also yielded well and, in addition, proved highly resistant to frost. Alfy II, Jufy I and II, Strube 10.022, Peko and lines P<sub>1</sub>R<sub>1</sub>S and T from the hybrid H325 (Jubilé x Fylgia) gave the highest yields of the spring wheats tested; Alfy I displayed a high degree of resistance to rust. Trio, Soleil II [Sun II] and R37 out-yielded all other oat varieties. Among the barleys, Herta gave the best yields.

- 2788 FREY, K. J., ROSSMAN, E. C. & TASCHNER, N.

**Prepunching of I.B.M. cards with plot code numbers.**

Agron. J. 1954 : 46 : 140-41.

A method of prepunching plot codes on cards by means of a gang punch machine from a set of master cards has been found to be valuable as a means of eliminating key-punching of plot codes in analysing and summarizing data from lattice-design trials of varietal yields by means of the IBM punched-card system.

- 2789 Årsberättelse för år 1953 avgiven den 28 januari 1954 av Akademiens Sekreterare. (**Annual report for the year 1953 delivered on 28 January 1954 by the Secretary of the Academy**). K. LantbrAkad. Tidskr. 1954 : 93 : 14-34.

The subjects considered by the Swedish Royal Academy of Agriculture during 1954 included the introduction of new crop plants into Sweden from other countries (cf. Abst. 1761). The wide economic developments to which such introductions may lead are evident from the place held by lucerne, the soya bean and the potato in agricultural production to-day.

The following subjects were also considered at general meetings of the academy: the ecology of polyploids; grain drying; and the judging of malting barley.

Grants were awarded for research on the inheritance of nematode resistance in red clover; flower characters in diploid and tetraploid strains of red clover; nitrogen fixation in tetraploid red clover; and induced X-ray mutants in wheat.

## CEREALS

- 2790 MOU, T.-S. & LIN, C.-S.  
(**Report on investigations of the main edible crops of the mountainous districts in Taiwan**). Taiwan Nungyeh Shihyenso Paokao/Bull. Taiwan agric. Res. Inst. 1952 No. 10 : Pp. 30. [Chinese].

This report includes lists of the principal varieties of maize, sorghum, *Setaria italica*, *Panicum miliaceum* and rice grown by the aboriginal inhabitants of the Taiwan mountains.

- 2791 HORE, H. L. & SIMS, H. J.  
**Recommended . . . cereal varieties**. J. Dep. Agric. Vict. 1954 : 52 : 117-25.

Varieties of wheat, oats and barley recommended for different regions in Victoria are described. The new wheat Sherpa (Ghurka x Amity), developed at the Dookie Agricultural College, is available for commercial sowing for the first time. It is a midseason variety, resistant to flag smut and possesses satisfactory field characteristics; although its grain quality is not outstandingly good, the variety should improve the over-all quality of Victorian flour. Sherpa has given good yields in the north-eastern districts of the State and in the Mallee region.

- 2792 PETROV, I. A.  
(**Directing changes in the heritable properties of cereals**). Bot. Ž. (Bot. J.), Moscow 1953 : 38 : 782-804. [Russian].

New varieties of cereals adapted to the climatic and soil conditions of the Karelo-Finnish Republic and obtained by intervarietal, inter-specific or intergeneric vegetative hybridization are briefly described.

**Wheat.** New spring forms, some of which produce large semivitreous grain and show resistance to lodging, include vegetative hybrids between wheat and barley, wheat and oats, *Triticum vulgare* and *T. turgidum* and a spring and a winter wheat.

**Barley.** Spring varieties distinguished by earliness, good tillering capacity, productive ears and resistance to lodging and shedding are listed. They include a multirowed naked barley, obtained by grafting one hulled variety on another hulled variety, and a two-rowed naked barley, obtained by grafting a two-rowed hulled barley on *T. turgidum*. The new hulled varieties include a six-rowed form, a hybrid between a two-rowed hulled barley and rye; a hybrid between barley and oats; and another two-rowed variety, a hybrid between two hulled two-rowed barleys.

**Rye.** A branching winter form, with ears bearing as many as 170 grains each, has been obtained by vegetative hybridization between the rye Vjatka and a branching spring wheat.

- 2793 OINUMA, T.  
**Karyomorphology of cereals**. Biol. J. Okayama Univ. 1952 : 1 : 12-71.

Caryotypical studies of seven genera are reported: *Hordeum*, *Secale*, *Aegilops*, *Triticum*, *Avena*, *Agropyron* and *Bromus*. Investigation of *H. agriocrithon* and three cultivated barleys showed that (1) the caryotype was constant for a given strain and (2) the methods of preparation and staining employed did not alter the relative size and form of the chromosomes. The general designation, a-g, representing the chromosomes in order of decreasing lengths, was used as the foundation of the caryotype formula for any basic set of 7, the detailed formulae for the individual genera being distinct.

Wild species of *Hordeum* were differentiated by means of chromosome a, *H. agriocrithon* and *H. spontaneum* having  $a_1a_1$  chromosomes, *H. pusillum*,  $a_2a_2$ , and *H. gussoneanum*, *H. murinum*, *H. brachyantherum* and *H. nodosum*,  $a_3a_3a_3a_3$ . Five categories were established among 74 cultivated barleys from various parts of the



world, two additional chromosome types  $a_4a_4$  and  $a_5a_5$ , being distinguished. The number of cultivated varieties representing the different karyotypes gradually decreased from  $a_1a_1$  to  $a_5a_5$ ; an evolutionary sequence from  $a_1a_1$  to  $a_5a_5$  may have occurred. The region extending westwards from the Hindu Kush mountains to European Russia contains all five types. Data from intervarietal hybrids indicated the following relationship with respect to length of chromosome  $a$ :  $a_2 < a_1 < a_3 < a_4 = a_5$ . A case of reciprocal translocation in the  $F_1$  of a cross between two two-rowed varieties, both of the type  $a_2a_2$ , was studied; the short arms of chromosomes  $e$  and  $g$  may have undergone exchange. Chromosome  $a$  was associated with the character of row number,  $F_2$  plants with  $a_2a_2$  and  $a_3a_3$  being two-rowed and six-rowed, respectively, and those with  $a_1a_2$  and  $a_2a_3$  being intermediate. The locus for row number has been assigned by previous investigators to linkage group I: chromosome  $a$  probably coincides with this linkage group.

Five differential karyotypes were distinguished in *S. cereale*,  $a_1d_1$ ,  $a_1d_2$ ,  $a_2d_1$ ,  $a_2d_2$  and  $a_3d_2$ . Type  $a_1d_1$  appeared to be the most primitive and may have gradually given rise to the other four. Study of plants with extra chromosomes suggested that a strain with  $n = 8$  originated by fragmentation, whereas another with  $n = 9$  arose as the result of both fragmentation and duplication.

From an analysis of *T. monococcum*, *T. dicoccum*, *T. durum*, *T. spelta*, and *T. vulgare*, the karyotype formulae  $a_1b_1c_1d_1e_1f_1g_1$ ,  $a_2b_2c_2d_2e_1f_2g_1$  and  $a_3b_3c_1d_2e_1f_3g_1^*$  are proposed for the genomes A, B and D, respectively. The karyotype of *Ae. squarrosa* completely corresponded with that of genome D. Since the karyotype of B has the most primitive form, this genome is believed to have appeared first. The author puts forward a theory of "parallelism of genome and karyotype" for *Triticum*.

The following karyotypes were recognized in *Avena*: *A. strigosa*,  $b_1b_1$ ; *A. barbata*,  $b_1b_1b_1b_1$ ; *A. byzantina* and *A. fatua*,  $b_2b_2b_2b_2b_2$ ; and *A. sativa* vars. *orientalis* and *patula*,  $b_1b_1b_1b_1b_2b_2$ . All the species showed regular bivalent formation at meiosis. The karyotypes are discussed with reference to the phylogenetic hypotheses of previous investigators.

The differential karyotype formulae  $4a_12a_24b_12b_2$  and  $4a_12a_24c_12c_2$  are proposed for *Agropyron semicostatum* and *B. unioides*, respectively. A

probable origin from hybridization between  $4n$  and  $2n$  forms, followed by chromosome duplication, is postulated for both species.

Finally, intergeneric homologies in the morphology of corresponding chromosomes in the basic series  $a-g$  are summarized and literature on intergeneric relationships among the Hordeae is briefly surveyed. Intergeneric crossabilities show some correspondence with karyomorphological similarities.

#### 2794 STREBEYKO, P. & DOMAŃSKA, H.

Badania siły ssącej kiełkujących nasion pszenicy i jęczmienia. (*Investigations on the suction force of germinating wheat and barley seeds*).

Roczn. Nauk rol. 1953: Ser. A: 67: No. 4: 109-24.

The germination energy of seed in  $KNO_3$  solutions of various concentrations was taken as an indicator of the suction force of the seeds of 9 wheat and 16 barley varieties.

In wheat, marked varietal differences were observed, these differences being greatest in a solution of concentration 0.6 mol.  $KNO_3$ . At this concentration the varieties Komorowska and Śląska IV [Silesian IV] showed germination energy values less than half those of Barbarossa, Eka and Ostka Mikulicka [Awned Mikulicka]; at all concentrations Barbarossa and Eka had higher values than any of the others and at nearly all concentrations Śląska IV had the lowest value.

In barley, the varietal differences were even greater. At a concentration of 0.4 mol.  $KNO_3$ , Sobieszyński showed a germination energy 16 times greater than that of Sandomierski and 12 times greater than that of Freja or Browarny [Brewing Barley]. Generally the naked barleys, Rajski [Celestial] and Orkisz Zakopiański and the multi-rowed varieties, Mazowiecki and Sobieszyński showed greater resistance to high osmotic pressure than the two-rowed, awned varieties.

#### 2795 KUZNECOVA, E. S.

(Some laws of geographical variation of growing period in cultivated plants).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952: 29: No. 3: 27-41. [Russian].

The data presented show that the degree to

\* Given as  $a_3b_3c_1d_1e_1f_3g_1$  in the article summarized in Abst. 2827.

which spring wheats and other long-day cereals reduce their vegetative period on being moved northwards is directly related to the length of their photostage; thus certain wheats such as those of Pakistan or Japan, which at Maikop were early, when grown at Hibiny beyond the arctic circle eared later than wheats from Omsk. Northern forms, on the other hand, when grown in the south reacted more strongly than southern wheats to unfavourable growing conditions.

- 2796 PREZENT, I. I.  
(**Double fertilization and vigour**).  
Izv. Akad. Nauk SSSR (News Acad. Sci. USSR) 1954 : No. 1 : Ser. Biol. : 59-73. [Russian].

Mičurinite experiments with wheat and rye showed that the removal of the endosperm has a similar effect upon succeeding plant generations as inbreeding has upon cross pollinating and restricted pollination upon self pollinating plants. Extensive variability in respect of morphological characters, which occurred in the progenies of the wheat Albidum 604 and the ryes Vjatka, Tulunskaja Zelenaja [Green Tulun] and Onohoiskaja after the endosperm had been removed, is described. Experiments with rye showed that plants that had had the endosperm removed gave less vigorous, less productive and less hardy progenies. The removal of the endosperm also accentuated the physiological depression of inbred plants or plants pollinated with a limited amount of pollen. The yield of plants, which had shown physiological depression due to the removal of the endosperm or to the combined effect of inbreeding and the removal of the endosperm, was improved in the next generation when untreated seed was sown but in the next generation the yield was again low. Other experiments with rye, involving the transplantation of the embryos on to a foreign endosperm, suggest that deleterious inbreeding effects may be transmitted to material through the endosperm as well as through the embryo. Transplanting the embryo or endosperm of an intravarietal wheat hybrid on to a corresponding portion of a self-pollinated or cross-pollinated wheat plant improved such characters as length of ear, grain yield and 1000 seed weight. Similar beneficial effects upon productiveness and vigour, explained from the Mičurinite viewpoint by heterogeneity, were obtained by transplanting embryos on to the endosperms of other plants of the same variety. This experiment also showed that heterosis is more pronounced if transplantations are made when the grain has not reached full maturity.

- 2797 MATHON, C-C.

Tératologie et morphologie expérimentales sur la base de la modification des conditions écologiques habituelles du développement (seconde note). (**Experimental teratology and morphology based on modification of the usual ecological conditions of development. II**).

Bull. Soc. bot. Fr. 1954 : 101 : 19-24.

Anomalies obtained in the inflorescences of varieties of *Hordeum vulgare* and *H. trifurcatum* by summer sowing (cf. Abst. 1098) were transmitted to the  $F_1$  and  $F_2$  even when these were sown in spring. These findings are considered to substantiate Lysenko's theory of the inheritance of characters induced by a change in photoperiodic conditions. Similar experiments with wheat, oats and rye also resulted in morphological changes in the inflorescence.

- 2798 WAGNER, S.  
Die Erhaltung von Landsorten in der Schweiz. (**The preservation of land races in Switzerland**).  
Schweiz. landw. Z. 1954 : 82 : 568-70.

The importance of land races as sources of breeding material is stressed and the need to collect samples of existing races before they are superseded by pedigree varieties is emphasized. The Agricultural Research Station at Zürich-Oerlikon has assumed responsibility for this task and has organized the cultivation in their place of origin of land races of wheat, rye, maize and barley, mainly from Alpine regions. Among races of interest so far discovered are mildew-resistant barleys from the Fellers region, very early-maturing barleys from Münstertal, rye races from Graubünden capable of surviving for long periods under snow drifts, and certain races of maize highly resistant to cold.

- 2799 SCHAPER, P.  
Resistenzzüchtung bei Getreide. (**Breeding for resistance in cereals**).  
Saatgutwirtschaft 1954 : 6 : 68-69.

A short, popular account of the principal diseases to which wheat, oats and barley are susceptible is given and the technique of breeding for resistance discussed, special emphasis being placed on the value of land races to the breeder.

- 2800 **Cereal news from Canada.**

Cereal News 1954 : 1 : No. 6 : 11-20.

At Ottawa, the varieties Beaver and Ajax showed the most resistance to frost in early stages of maturity. Race T16 can be used to test for resistance to dwarf bunt. Garry 1692-27,



a pure line selected at Winnipeg, gives higher yields than Garry. A new race of stem rust of oats, designated 7A, attacks RL2123 but not Garry. It is suggested that the homozygous flax diploids obtained by the use of colchicine were produced by the doubling of the chromosomes in the female gametes.

- 2801 PIATTI, F.  
Die österreichischen Getreidesorten  
bewähren sich. (**The Austrian cereal  
varieties prove their worth**).

Landwirtschaft 1954 : No. 11/12 : 171-72.

The superiority of Austrian varieties over foreign introductions is stressed; although the latter occasionally give higher yields they tend to be inferior in quality. Among the other advantages of native varieties are greater winter hardiness and resistance to drought in autumn sowings. The primary objective of cereal breeding in Austria at the present time is the development of varieties suitable for mechanical harvesting.

- 2802 Resistensforedling av korn. Rotråtesykdommene kornprodusentenes fiende nr. 1. (**Breeding for resistance in cereals. Rootrot diseases—enemy No. 1 of the cereal producer**).

Norsk Landbr. 1954 : 20 : 118-21.

This address by Erling Strand on Norwegian research on breeding disease-resistant bread cereals is concerned mainly with resistance to mildew (*Erysiphe graminis*), loose smut and the root-rot complex of cereals. The difficulties encountered and the advances made so far are discussed. The population of races of *E. graminis* var. *tritici* in Sør-Østland, like those in northern Europe generally, differs from the races on the American continent; and experiments have shown that a new test collection of wheats will have to be built up for use in Norway.

Most of the physiological races of *E. graminis* recorded in Norway have been described also in Germany, with the exception of one which, as far as is known, has not been described elsewhere.

- 2803 **Journal of the Department of Agriculture, Dublin 1952-53 : 49 : Pp. 248 + [49].**

*Field experiments, 1951. (pp. 158-72).*

A summary is given of the results of county trials on (1) the spring wheats Atle, Progress and Kärn II, (2) the oats Glasnevin Triumph and Sun II, and (3) barleys Ymer, Herta and Glasnevin 22.

*Cereal variety trials at the department's schools in 1950 and 1951. (pp. 173-94).*

Trials of the following varieties and selections are reported: spring wheat, Atle, Progress, Kärn II, Ella and five April Red x Atle selections; oats, Glasnevin Triumph, Sun I, Sun II, Opus, S221, S225, Q40, Potato (Ardee); Potato (NS) and Scotch Potato; and barley, Spratt-Archer 37 No. 3, Beorna, Glasnevin 22, Glasnevin 9, Ymer and Herta.

*Report of the seed propagation division, 1951. (pp. 195-212).*

Reports of four trials of barley varieties are included: (1) a small-scale experiment on Glasnevin 22, Beorna, Herta and 22 Spratt-Archer x Kenia selections; (2) a drill-strip test of Herta, Maja, Beorna and No. 9; (3) a large-scale trial of Spratt Archer 37 No. 3, Beorna, Binder and Glasnevin 5; and (4) the European Brewery Convention trial at Ballinacurra. No. 9, a new hybrid selection, should prove useful as a fodder type; it is highly resistant to lodging. In (4) only Carlsberg showed satisfactory malting properties.

- 2804 STRAND, E.  
Korn og kornsorter. (**Cereals and cereal varieties**).

Samvirke 1954 : 49 : 139-41.

The results to date of trials of Norwegian, Finnish and Swedish varieties of oats, barley and spring wheat are discussed from the standpoints of stiffness of straw, earliness, yield, lodging, vegetation period, sprouting in the ear and shedding.

- 2805 Høstemetoden medbestemmende ved valg av kornsort. (**The method of harvesting, one of the factors in choosing a cereal variety**).

Norsk Landbr. 1954 : 20 : 77-81; 126-30.

Numerous well known varieties of barley, oats and spring wheat, bred at various Norwegian research stations, are described and discussed from the point of view of their suitability for cultivation in northern and southern Norway, the different districts being treated by different writers.

The good qualities of the old, land barley Dønnes receive special mention; it is earlier than the Svalöf barley Edda, which it has surpassed in grain yield on mineral soil in Nordland.

- 2806 ROBERTSON, J. H. & JENSEN, E. H.  
**Nevada results on spring barley and wheat variety trials.**

Circ. Nev. agric. Exp. Sta. 1954 : No. 5 : Pp. 11.

In barley trials conducted during 1950-1953 at

the farm of the University of Nevada, Reno, the variety Frontier regularly outyielded Trebi; tested for only two years, Bonneville also gave higher yields than Trebi. In the wheat trials carried out during 1950-52, the average yields of the highest yielding varieties, Lemhi, Federation, Big Club 43 and Idaed, did not differ significantly.

## WHEAT

- 2807 REITZ, L. P. & JOHNSTON, C. O.  
**Varieties of hard red winter wheat in the United States.**  
Circ. US Dep. Agric. 1954 : No. 938 : Pp. 24.

The circular provides information on the origin, history, distribution and characteristics of 33 established varieties and 7 recently distributed hard red winter wheats. Notes are also given on a number of miscellaneous old and new varieties.

- 2808 WEIBULL, G.  
Sortfördelningen vid 1951 och 1952 års veteodling. (**The distribution of varieties in the 1951 and 1952 wheat crops**).  
Weibulls ill. Årsb. 1954 : 49 : 16-18.

In amplification of previous studies (cf. *PBA*, Vol. XXIII, Abst. 1872 and Vol. XXIV, Abst. 1784), the proportion of various Swedish and other spring and winter varieties in the total wheat harvest in Sweden has been examined. Two thirds of the total winter wheat crop and three-quarters of the spring wheat production were obtained from Weibull's varieties.

- 2809 **Cereal news from Canada. Richmond wheat.**

Cereal News 1954 : 1 : No. 11 : p. 13.

The soft white wheat Richmond (Ottawa 2623A), developed by the Cereal Crops Division, Otawa, from the back cross of Dawson's Golden Chaff x Ridet to the former variety, was licensed in 1953 (cf. Abst. 1864).

- 2810 **Cereal news from Canada. Lake wheat.**

Cereal News 1954 : 1 : No. 11 : p. 15.

Lake (Regent x Canus), developed at the Experimental Station, Scott, Sask., has been licensed. It is suitable for the dry growing conditions usually experienced in western Saskatchewan; during the past seven years it has outyielded Thatcher by an average of 2 bushels per acre. Lake does not possess resistance to race 15B of stem rust but such resistance is not required in the area in which cultivation of the variety is expected. It has resistance to

bunt; its kernels are large and do not bleach easily; and its pubescent glumes render it easily distinguishable. In quality Lake equals Marquis.

- 2811 **New Zealand Wheat Review 1950, 1951, 1952.**  
1953 : Pp. 68.

*General review of the seasons.* (pp. 6-8).  
Dreadnought and Hunters consistently gave the highest yields of 10 varieties cultivated during the period 1947-52.

*Calder, J. W. Trend of wheat yields in New Zealand.* (pp. 17-18).

The increase of 40% in wheat yields which has taken place over the past 70 years is due partly to improved agronomic practices and partly to better varieties.

*Cruickshank, I. A. M. Report from crop research division.* (pp. 19-20).

Studies of varietal resistance to eye spot and the development of varieties resistant to powdery mildew are being carried out.

*Blair, I. D. Recent wheat-disease problems.* (pp. 21-24).

The failure of the 1952 crop is discussed and the need for selecting varieties resistant to disease is emphasized.

*Spring-sown wheat for Canterbury.* (p. 41).

The Australian variety Gabo gave promising results in variety trials.

*Notes from the Wheat Research Institute.* (pp. 41-45).

The effect of premature sprouting of wheat grains on the quality of the flour has been minimized by the selection and blending of wheat lines least affected by sprouting. In the 1953 harvest Dreadnought, Hilgendorf and Yelder showed least shrivelling of the grain and the baking quality of the last two varieties remained normal.

*Notes from Crop Research Division.* (pp. 47-48).

Attempts are being made to breed the following: (1) a general purpose wheat with higher yields than Cross 7; (2) an early maturing variety, resistant to lodging, to replace Tainui on the North Island; (3) a wheat giving high yields and possessing stiff straw and tight chaff suitable for highly fertile soil; (4) a wheat of high quality giving better yields than Hilgendorf; (5) a line of Cross 7 resistant to mildew, and (6) a spring wheat suitable for the central regions of Canterbury. In addition, the growing of mechanical mixtures of lines with high yield and quality is being investigated and the



inheritance of resistance to shattering and mildew, protein content and kernel weight is being studied. The variety Hilgendorf produces good quality grain with a high protein content.

Lynch, P. B. *Field experiments.* (pp. 49-53).

Varietal trials at several centres during the period 1949-52 are reported.

*Survey of wheat-growing districts.* (pp. 54-67).

The comparative yields of varieties grown in the districts of Canterbury, Waimate and Waitaki, Central and South Otago and Southland, Marlborough, Nelson, and North Island are given and recommendations of the best varieties for cultivation in these regions are made.

2812. ÅKERMAN, A.

Svalöfs vârvetesorter. (**Svalöf spring wheat varieties**).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : 15-20.

A brief outline is given of the progress made in breeding spring wheats suitable for the different regions of Sweden, with tables showing the performance of varieties such as Svenno (cf. Abst. 194), Progress, Ella, Pondus, Fylgia, Rival, Diamant II [Diamond II] and Drott [King] in trials in different localities of Sweden.

2813 FAJERSSON, F.

Aktuella vârvetesorter. (**Interesting spring wheat varieties of today**).

Weibulls ill. Årsb. 1954 : 49 : 11-16.

On the basis of official trials and of experience at the Weibullsholm Plant Breeding Institute, the spring wheats Kärn II, Pondus and Svenno (cf. Abst. 194), all bred at that institute, are compared with special reference to the most suitable regions of Sweden in which to grow them. Yield, earliness, strength of straw, manuring response, and mildew resistance are also discussed.

Though not able to compete with Svenno, Kärn II or Pondus in southern Sweden, the Svalöf wheat Drott [King], put on sale in spring 1954, will be further tested in other regions.

2814 MOSEMAN, J. G. & SMITH, L.

**Gene location by three-point test and telocentric half-chromosome fragment in *Triticum monococcum*.**

Agron. J. 1954 : 46 : 120-24.

The relationships of the genes *c2*, *ga*, *js* and *y*, belonging to linkage group D in *T. monococcum*, were analysed. The factors *js* and *y* were less than one cross-over unit apart. Three-point data indicated that the linear order of the five

genes was *c2 cx(y,js)ga*; the relative order of *y* and *js* could not be determined. Using plants with 14 normal chromosomes + a telocentric half-chromosome, it was found that *y* and *js* were situated on the half of the chromosome not associated with the telocentric.

2815 MORRISON, J. W.

**A dicentric wheat chromosome in division.**

Canad. J. Bot. 1954 : 32 : 491-502.

An  $F_2$  plant of *Triticum aestivum* x *T. dicoccum* possessed 36 normal chromosomes and 1 dicentric. The dicentric probably originated by breakage and fusion of two nonhomologous univalents in  $F_1$  meiosis. In meiosis, pairing between the dicentric and its two homologues was nearly always complete, and both centromeres were effective in the orientation and movement of the chromosome. In one spike, internal chiasmata were formed at metaphase I in the intercentric region; at anaphase I the dicentric had broken without the formation of a bridge, repulsion between the two centromeres having forced its arms apart. It is postulated that the effect of one centromere was nullified by the other so that reunion at the point of breakage was prevented. In another spike, little or no internal pairing was detected; the dicentric remained intact and bridges were common at anaphase I. In mitosis in cells of root tips, anther-wall tissue and sectioned ovaries, only a very few bridges were observed; it is therefore concluded that the dicentric probably persisted as the result of parallel separation of the chromatids. Variation in chromosome number, with or without the dicentric, observed in root-tip cells, suggested that whole chromosomes or portions of chromosomes were frequently lost; possible cytological mechanisms which could bring about such losses are suggested.

2816 VIGOROV, L. I.

**(Soft wheats and spelts obtained from *Aegilops triuncialis*).**

Bot. Ž. (Bot. J.), Moskva 1953 : 38 : 708-13. [Russian].

At Sverdlovsk, some plants of *Ae. triuncialis*, which has been trained for the spring habit, were accidentally pollinated by hard and soft wheats from an adjacent field. Some  $F_1$  hybrids resembled *Aegilops*, but bore longer spikelets and ears. The  $F_2$  showed morphological changes and developed into a soft wheat with similar properties to the cultivated central Asiatic varieties Erythrospermum 5755, Erythrospermum 841 and Surhak 5688. No intermediate

forms between *Aegilops* and hard or soft wheats were observed in the  $F_2$  or later generations. Grain yield per ear and length of ear of the new soft wheat improved each year. Other  $F_1$  hybrids included a sterile wheat form, which resembled the hybrids *Ae. longissima* x *Triticum durum* and *Ae. ventricosa* x *T. durum*, and a spelt form with more spikelets per ear and larger ears than found in spelts. This latter form was highly fertile and bore well-formed grains. No segregation occurred in the  $F_2$ . Second generation plants were white-eared, awned and resembled Armenian spelts. Only their dwarf habit (25–30 cm. in the  $F_2$ ) suggested a hybrid origin. In later generations the material grew appreciably taller.

2817 FUKASAWA, H.

**Studies on restoration and substitution of nucleus in *Aegilotriticum*. I. Appearance of male-sterile *durum* in substitution crosses.**

Cytologia, Tokyo 1953 : 18 : 167–75.

In back crosses of Tschermak's amphidiploid *Aegilotriticum* (*Aegilops ovata* ♀ x *T. durum* ♂) to *Ae. ovata*, the process of restoring the *Ae. ovata* genomes to the plasma of this species was accomplished in the course of three successive crosses at the Biological Institute, Kobe University, Japan. The final plants were morphologically similar to *Ae. ovata*, had 14 bivalents at metaphase I and were equal to *Ae. ovata* in pollen and seed fertility. Three successive back crosses of *Aegilotriticum* to *T. durum* resulted in plants closely resembling *T. durum*, with 14 bivalents. All the pollen of these plants degenerated, but the female organs were fully functional and artificial pollination with *T. durum* or *T. dicoccum* resulted in seed set. The male sterility was transmitted to all plants of the next generation. Similar degeneration of the pollen was observed in normal *T. durum* which ripened in winter after vernalization and long-day treatment. Plants with *Ae. ovata* plasma in combination with 28 chromosomes of *T. durum* and 1–3 extra chromosomes of *Ae. ovata* as univalents exhibited 88–92% pollen fertility.

2818 NAKAJIMA, G.

**$F_1$  plant of *Triticum timopheevi* x *Haynaldia villosa*.**

Cytologia, Tokyo 1953 : 18 : 251–52.

The single  $F_1$  plant ( $2n = 21$ ) derived from the above cross at the Biological Laboratory, Gumma University, Japan, was on the whole morphologically intermediate between its

parents. It did not develop any pistils or stamens.

2819 KISS, Á. & RÉDEI, G.

**Experiments to produce rye-wheat (*Triticale*).**

Acta agron. 1953 : 3 : 257–76.

The literature on intergeneric crosses between wheat and rye is reviewed. At the Martonvásár Institute for Research on Crop Plants, Hungary, Bánkúti 1201 has proved to be the most suitable wheat variety for use as the female parent while the ryes Kisvárdai and Magaróvári are the best pollinators. Pollination with the mixed pollen of several varieties of rye gave better results than when the pollen of only one variety was used. The  $F_1$ ,  $F_2$  and  $F_3$  of the above crosses display considerable hybrid vigour; back crosses to both wheat and rye have been effected successfully.

2820 NAKAJIMA, G.

**Genetical and cytological studies in the breeding of amphidiploid types between *Triticum* and *Secale*. V. External characters and meiosis of the  $F_1$  *T. pyramidale* x *S. cereale*.**

Cytologia, Tokyo 1953 : 18 : 122–27.

The one  $F_1$  plant ( $n = 21$ ) of *T. pyramidale* ♀ x *S. cereale* ♂ obtained at the Biological Laboratory, Gumma University, Kiriyu, Japan, was intermediate between its two parents for most characters. During the first meiotic division, 0–4 bivalents and 21–13 univalents were formed. The bivalents may have been due to autosyndesis between chromosomes of the A and B genomes of *T. pyramidale*. The chromosomes were distributed to the opposite poles in ratios of 11:10 to 15:6, the mode being 11:10 (41.67%). Some cases of longitudinal splitting of all univalents were observed at meiosis I, with the consequent production of restitution nuclei. Five  $F_2$  plants were raised from the 7 seeds obtained from 37  $F_1$  spikelets by natural selfing.

2821 SCHNEIDER, R.

**Der gegenwärtige Stand der Weizen-Roggen-Bastardierung. (The present state of wheat-rye hybridization).**

Z. PflBau 1954 : 5 : 44–48.

A survey of attempts made since the beginning of the century to cross wheat and rye is given, special emphasis being placed on the work of the Agricultural Research Institute at Weißenstephan. The principal economic characters of the hybrids so far obtained are discussed, and problems relating to the quality of the grain and the fertility of the hybrids are examined.



2822 GAUL, H.

Über meiotische Fragment- und Brückenbildung der Bastarde *Secale* und *Triticum* x *Agropyrum*. (**On the formation of meiotic fragments and bridges in crosses of *Secale* and *Triticum* with *Agropyron***).

Chromosoma 1954 : 6 : 314-29.

A study was made of meiotic irregularities in crosses of *S. cereale*, *T. aestivum*, *T. durum* and *T. dicoccum* with *A. intermedium*. Numerous instances of early degeneration of the pollen mother cells and archesporia, stunted anthers, cytomixis, lack of synchronization and stickiness, clumping and excessive contraction of the chromosomes were observed in each of the crosses, in addition to frequent fragmentation and formation of bridges. These irregularities, which closely resembled the effects normally obtained by X irradiation and treatment with chemicals, were most marked in the *S. cereale* x *A. intermedium* plants, where they sometimes led to a complete disruption of the cell. The cross *T. aestivum* x *A. intermedium* exhibited least meiotic irregularities. Considerable variation from plant to plant of identical parentage was, however, observed. In the 4n *Triticum* x *A. intermedium* crosses, bridges in anaphase I are thought to result from the breakage and recombination in prophase of nonhomologous univalents, which leads to the formation of false bivalents in metaphase I. Bridges in anaphase II of these crosses arise from the fusion of broken sister chromatids. In 6n *Triticum* x *A. intermedium* crosses, bridges are attributed to inversion.

2823 YAMAMOTO, K.

(**On the effect of temperature and concentration on the treatment of seeds of F<sub>1</sub> wheat-rye hybrids with colchicine**).

Nihon Sakumotsugaku Kai Kiji (Proc. Crop. Sci. Soc. Japan) 1953 : 21 : 325-27. [Japanese].

Chromosome doubling was best induced at low temperatures (4-6° C); there was little difference in effectivity between concentrations of 0.025 and 0.05%.

2824 ČIRKOVA, E. I.

(**Vegetative hybridization and interspecific conversion**).

Agrobiologija (Agrobiology) 1954 : No. 1 : 83-86. [Russian].

At Voronež, 15 normal fertile rye grains were

found in the ears of the 25 plants of the F<sub>1</sub> of the vegetative wheat hybrid Velutinum 37u/Ferrugineum 37-48. It is thought that vegetative hybridization may promote interspecific conversion.

2825 HITRINSKIĬ, V. F.

(**Directed change of spring wheats into winter wheats**).

Agrobiologija (Agrobiology) 1954 : No. 1 : 35-54. [Russian].

At Odessa, the spring wheats Lutescens 1163 and Odessa 13 were changed into winter wheats distinguished by earliness, vigour, high yield, large ears, good grain quality and resistance to lodging and shedding. The method employed consisted in shattering the inheritance of the material by sowing it in late autumn and training it in the succeeding generations for winter habit. However, the progenies of a few plants remained constant in respect of their spring habit or gave segregates in respect of this character. The winter forms had a lower water content and higher dry substance and sugar contents than the initial forms, showed a prostrate habit characteristic of normal winter wheats and bore short, narrow and hairless leaves.

2826 LANDI, R.

I reperti vegetali della palafitta di Barche di Solferino. (**Plant finds in the lake dwellings of Barche di Solferino**).

Genet. agr. 1954 : 4 : 102-15.

Seeds found in a Bronze-age site at Barche di Solferino in the province of Mantova in northern Italy include *Triticum monococcum*, *T. sphaerococcum* and *T. compactum* as well as *T. dicoccum* and *T. vulgare*.

2827 OINUMA, T.

(**Caryomorphology of cereals. IX. On variation in the caryotype of *Aegilops* and *Triticum* and the relation between caryotype and genome**).

Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 219-26. [Japanese].

A comparative study of chromosome morphology in *T. monococcum* (AA), *Ae. squarrosa* (DD), *T. dicoccum* (AABB), *T. durum* (AABB), *T. spelta* (AABBDD) and *T. aestivum* (AABBDD) is reported. The three genomes were found to have a constant morphology irrespective of the species in which they occur. The caryotypes were as follows: A,  $a_1b_1c_1d_1e_1f_1g_1$ ; B,  $a_2b_2c_2d_2e_1f_2g_1$ ; and D,  $a_3b_3c_1d_1e_1f_3g_1$ .

- 2828 YAMASHITA, K.  
**(Studies on X-ray-induced reciprocal translocations in Einkorn wheats. V).**  
 Idengaku Zasshi/Jap. J. Genet. 1953 :  
 28 : 238-47. [Japanese].

In this lecture to the Japanese Genetical Society, the author reviews the main results of his investigations on the above subject. The principal original papers on which it is based have been summarized already in *Plant Breeding Abstracts* (cf. Vol. XXII, Abst. 1772 and Vol. XXIV, Absts. 221, 222 and 224).

- 2829 BLANCHARD, M.  
 Contribution à la détermination des espèces et variétés de blés cultivées en Algérie par la réaction des grains, des épis et des pailles à l'acide phénique.  
**(Contribution to the identification of species and varieties of wheat grown in Algeria by means of the reaction of the grain, ears and straw to phenol).**  
 Proc. int. Seed. Test. Ass. 1953 : 18 :  
 161-66.

At the Central Seed Experiment and Plant Breeding Station, Maison-Carrée, Algeria, varietal differences in the colouring of the grain, ear and straw were observed when specimens of *Triticum durum* and *T. vulgare* were soaked in a 1% solution of phenol for a four-hour period. This technique is recommended as being of value in varietal identification.

- 2830 NUTTONSON, M. Y.  
**Phenology and thermal environment as a means for a physiological classification of wheat varieties and for predicting maturity dates of wheat.**  
 Amer. Inst. Crop Ecol. Wash. 1953 :  
 Pp. 108.

This monograph presents an analysis of extensive phenological data pertaining to a number of local winter and spring wheat varieties grown at 21 localities representative of the chief geographical regions of Czechoslovakia, and to the winter wheat Kharkof in two analogous localities of the Pacific Northwestern region of the United States, in conjunction with the use of meteorological records. Two of the main achievements of this analysis of data on intervals between emergence and heading, heading and ripening, emergence and ripening and on other relevant intervals are (1) the provision of information on the thermal requirements of winter wheat under uncontrolled field conditions

and (2) an indication of the value of classifying wheat varieties on a physiological-thermal basis by using summations of day-degrees for phenological behaviour within a given latitudinal range.

- 2831 DANTUMA, G.  
 Daglengte-onderzoek bij tarwe en gerst.  
**(Investigation of day length in wheat and barley).**  
 Vierde Cocobro-Jaarbje. 1954 : 62-69.

The response of a number of varieties to different day lengths was investigated at the Institute for Plant Breeding, Wageningen, Netherlands. Data on the optimal photoperiods for each variety are presented.

- 2832 JAKUBCINER, M. M.  
**(Some data on branched wheat).**  
 Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 :  
 No. 3 : 51-60. [Russian].

A number of further forms of *Triticum turgidum* with branched ears are described, and data are given concerning their cultivation in parts of Russia in the nineteenth century. The majority of the branched wheats are spring forms but A-Bugda and Bes-Bas-Bidai [Five-headed wheat] are semiwinter forms. Čudesnaja Blagodatj [Miraculous Bounty] has remained free from mildew and Čudnovata and Kubinskaja from yellow rust; most of them are distinguished by freedom from germination in the ear.

Reference is also made to certain branched forms of *T. polonicum*, *T. dicoccum* and *T. vulgare*.

- 2833 FUJII, T.  
**(An instance of morphologically different twin seedlings in the progeny of a wheat hybrid).**  
 Idengaku Zasshi/Jap. J. Genet. 1953 :  
 28 : 105-09. [Japanese].

Twin seedlings were obtained from a grain of the cross Sears' Nulli-VII (20<sub>II</sub>) x Matsumura's a-gigas (1<sub>IV</sub> + 19<sub>II</sub>). Both seedlings had 2n = 41 chromosomes, but while one was awnless, the other was tip-awned. In subsequent generations, the progenies of both seedlings segregated for chromosome number, plants with 20<sub>II</sub>, 20<sub>II</sub> + 1<sub>I</sub> and 21<sub>II</sub> appearing. The progeny of the awnless seedling were all awnless. In the case of the tip-awned seedling, segregation according to the ratio 1 awnless : 2 tip-awned : 1 awned occurred; there was no relationship between type of awning and chromosome number. It is suggested that the original tip-awned seedling



carried a small deficiency including the locus for awn type.

- 2834 BEREZNAKOVSKAJA, A. V.  
(**Observations on the variation of the hereditary constitution of wheat and barley under the influence of conditions of growth**).  
Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 42-50. [Russian].

Seed of a number of varieties of wheat and barley was grown for three successive generations in three different sets of conditions, namely, autumn sowing with and without irrigation and spring sowing with irrigation. Certain characters such as awn development, ear colour and pubescence in wheat and the fertility of the lateral florets in barley showed frequent differences in the different sets of conditions; thus awnless wheats often produced awns in the sowings without irrigation, glabrous wheats became pubescent and six-rowed barleys became two-rowed; spring barleys produced branched ears in autumn irrigated sowings. Characters such as time of maturity, tillering and yield were also affected and winter hardiness was increased by sowing in autumn with irrigation.

- 2835 WATANABE, Y.  
(**A cytogenetical study of triplet seedlings in wheat**).  
Senshokutai (Chromosome)/Kromosomo 1953 : No. 16 : 586-95. [Japanese].

A  $2x : x : x$  triplet grain was discovered in the variety Norin 55 [Ministry of Agriculture and Forestry 55] and a  $2x : 2x : 2x$  grain in the  $F_3$  of Tohoku 97 x Shinchunaga [New Mid-long]. In the haploid seedlings from the triplet of Norin 55, 21 univalents were usually formed at meiosis, though occasional bivalents or even a trivalent were sometimes observed. The haploids were completely self sterile, but a few grains were set when they were pollinated by the diploid triplet.

- 2836 YATSUYANAGI, S. & SAKAI, H.  
(**On the sensitivity of wheat to light. IV. The sensitivity to light of transplanted embryos of spring wheat. II**).  
Ikushugaku Zasshi/Jap. J. Breeding 1953 : 3 : 40-42. [Japanese].

A slight retardation in the rate of leaf emergence was noted when embryos of the spring wheat Norin 3 [Ministry of Agriculture and Forests 3] were transplanted to endosperm of the winter variety Akakawaaka [Red-husked Red] as compared with the Norin 3/Norin 3 controls.

- 2837 BANERJEE, R. M. & DAS, N. B.  
(**Studies on the diastatic activity of certain Indian wheats**).  
Indian J. agric. Sci. 1954 : 24 : Pt. I : 45-49.

The diastatic activity of the flour of 30 varieties analysed ranged from 150 to 230, as shown by estimations of the maltose figure (number of mg. per 10 g. flour). Diastatic activity bore no consistent relationship to protein or gluten content, although it tended to be inversely proportional.

- 2838 DE MIRANDA, H.  
De bakwaliteit van de in Nederland verbouwde tarwerassen. (**The baking quality of wheat varieties grown in the Netherlands**).  
Vierde Cocobro-Jaarbj. 1954 : 70-76.

The baking quality of the chief wheat varieties cultivated in the Netherlands is discussed. In tests conducted at the Central Institute for Nutritional Research at Wageningen, Mado, Capelle, Nord and Alba were adjudged superior to the other varieties examined.

- 2839 YAMAZAKI, W. T.  
(**Interrelations among bread dough absorption, cookie diameter, protein content, and alkaline water retention capacity of soft winter wheat flours**).  
Cereal Chem. 1954 : 31 : 135-42.

Investigations on varieties of soft winter wheat grown in the eastern United States indicated that bread dough absorption and alkaline water retention capacity were closely associated with each other and with biscuit spreading quality. Absorption was slightly more accurate than alkaline water retention capacity as a basis of grading varieties for biscuit diameter. Protein content of the flour was only slightly associated with biscuit diameter.

- 2840 BEARD, B. H. & POEHLMAN, J. M.  
(**A study of quality, as measured by the pearling test, in crosses between hard and soft wheats**).  
Agron. J. 1954 : 46 : 220-23.

Crosses of the hard wheats, Kawvale and Pawnee, with the soft wheats, CI12401, CI12454, W5638, W5652 and Fultz-PI94587-Fultz-Hungarian, were made at the Missouri Agricultural Experiment Station. Comparisons of the  $F_2$ ,  $F_3$  and parent varieties indicated that pearling quality was a multigenic character and that hardness of grain was dominant to softness. High correlation for pearling quality in successive generations indicates that the pearling test (cf. *PBA*, Vol. X, Abst. 102) can be used to

distinguish between hard and soft grain and can be evaluated at an early stage of breeding. Visual selection for hard, medium and soft types was shown to be unreliable.

- 2841 KARIŠNEV, R. V.  
(Some questions relating to breeding hard wheats for the Nonblack-Earth Belt).

Zemledelie (Agriculture) 1954 : No. 2 : 103-05. [Russian].

At Velikie Luki, the hard wheats Narodnaja [Popular] and Hordeiforme 27 have been improved by selection for vigour, productive tillering, well-formed ears and large grain. The improved form of Narodnaja yielded 2.65 c. more grain per ha. than the soft wheat Moskovka [Moscow] and the improved Hordeiforme 27 gave the same yield as Moskovka. The new hard wheats had 35-47% vitreous grain and their 1000 kernel weights were 45.7 g. and 47.4 g. respectively.

- 2842 MILLINGTON, A. J. & REMILTON, E.  
The flour strength of Australian wheat varieties.

J. Aust. Inst. agric. Sci. 1954 : 20 : 24-35.

Methods of measuring flour strength are discussed; it is shown that the water absorption, farinograph and Pelshenke tests do not always measure the same characteristics of flour quality. For a given variety, dry gluten percentage and Pelshenke time provide the basis of a reasonably good prediction of the strength figure. The varietal position with respect to strength in Australia is analysed.

On the whole no evidence has been obtained of a significant variety x locality interaction for flour protein per acre in any region of Australia. Data on Australian wheats have shown that response in terms of flour strength to increments in protein content is a varietal characteristic. Some investigations carried out in Australia and elsewhere on the inheritance of strength are briefly reviewed. For strength of Australian wheats two approaches are suggested: (1) selection of varieties giving superior strength at existing levels of protein content and (2) improvement of soil fertility.

- 2843 SÁNCHEZ-MONGE, E. & VILLENA, L. M.  
Nuevas variedades botánicas en especies del género *Triticum*. (New botanical varieties in species of the genus *Triticum*).

An. Estac. exp. Aula Dei 1954 : 3 : 253-60.

The 26 new varieties described include a cultivated form of *T. monococcum* with green grains,

a form of *T. turgidum* with smooth awns, a dense-eared *T. spelta* and certain forms of *T. aestivum* with double spikelets.

- 2844 BAYLES, B. B. & CLARK, J. A.  
Classification of wheat varieties grown in the United States in 1949. Tech. Bull. U.S. Dep. Agric. 1954 : No. 1083 : Pp. 173.

This revised classification (cf. *PBA*, Vol. XIII, Abst. 489) gives information on the main characteristics, history, distribution and synonymy of 224 wheats; of these 204 are varieties of *Triticum vulgare*. Identification keys are provided for the varieties of the different species.

- 2845 NEYZOROV, V. V. & KREĬDIK, B. M.  
(The main resources for increasing productiveness of cereals on collective farms in the Tadžik SSR). Zemledelie (Agriculture) 1954 : No. 3 : 66-72. [Russian].

The description of cereal varieties adapted to cultivation in Tadžikistan includes a reference to the branching wheat Muslimka and the hard wheat Ljailjak Bogori, both of which are high-yielding local varieties.

- 2846 KOZARENKO, M.  
(Some results from vegetative hybridization of cereals). Zemledelie (Agriculture) 1954 : No. 2 : 114-15. [Russian].

New forms of winter wheat with semivitreous grain have been obtained by vegetative hybridization between winter wheats and the spring wheat Melanopus 69. They outyield the standards in the Stavropolj territory and show resistance to bunt and smut. A new high-yielding and drought-resistant spring wheat was obtained by grafting a portion of the grain of the spring wheat Palestinka [Palestinian] on to a corresponding portion of a grain of the millet Džugara. The hybrid is 10-12 days earlier than Melanopus 69, has a vigorous root, thick straw 1.5-1.6 m. tall and large ears producing 2.5 g. grain each. The 1000 grain weight is 59 g.

- 2847 SISAKJAN, N. M.  
(A report on scientific research at the USSR Academy of Sciences for the year 1953). Vestn. Akad. Nauk SSSR (Rec. Acad. Sci. USSR) 1954 : No. 3 : 23-42. [Russian].

The following points are included in the section on biology. Experiments at the Institute of Genetics showed that spring wheats trained for



the winter habit at Omsk were hardier than winter wheats obtained by the same means and from the same material, but under different climatic conditions. Certain hybrids between some wheat and *Agropyron* species developed at the Principal Botanical Garden display high yield and resistance to lodging and fungi. Heritable changes were obtained in potatoes by inducing bud development from the inner layers of their tubers.

2848 STREBEYKO, P. & DOMAŃSKA, H.

Próby oznaczenia odporności pszenic na suszę w okresie kielkowania i wschodów. (Experiments to determine the resistance to drought of wheats at the stage of germination and emergence of the seedlings).

Roczn. Nauk rol. 1954 : 68 : Ser. A : 517-58.

With the aim of discovering any varietal differences in wheats in the relation between resistance to drought and the initial phases of seed growth, i.e. germination and emergence of seedlings from the soil, seeds were sown in soils of various humidities and the number of germinating seeds and emergent seedlings recorded. In one experiment 50 varieties of winter and 7 varieties of spring wheat were tested, but no replications were made. In the exploratory smaller experiments using winter wheats replications were used.

In general, the results show varietal differences in the capacity to extract moisture from soil of low humidity.

2849 KRASNJUK, A. A.

(The hard spring wheat Jugo-Vostochnaja 144).

Abrobiologija (Agrobiology) 1954 : No. 1 : 55-59. [Russian].

Jugo-Vostochnaja 144 [South-East 144], a wheat population comprising the best families of a hybrid between the hard wheat *Hordeiforme* 432 and *Triticum turgidum* var. *salomonis*, has been developed at Saratov. It shows resistance to lodging, drought and fungi, outyields the standard *Melanopus* 69 and produces large, vitreous grain with good baking and milling properties. It reaches uniform maturity, develops many productive tillers and has a long ear containing many grains.

2850 SUNESON, C. A. & SCHALLER, C. W.

Onas 53 wheat.

Bull. Calif. agric. Exp. Sta. 1954 : No. 742 : Pp. 7.

Onas 53 was developed by crossing Kenya and Onas 49 (Awned Onas x Onas 41<sup>2</sup>) and by

back-crossing repeatedly to Onas 49. It is resistant to all the races of stem rust now prevalent in California, most races of stripe rust, the most common races of bunt and *Septoria* leaf spot; it shows moderate susceptibility to leaf rust. Morphologically it differs from commercial Onas in being awned. In yielding ability and quality it is superior to other Onas types. Its flour is suitable for biscuit and pastry making or, when sufficiently high in protein content, for blending.

2851 FUTRELL, M. C. & DICKSON, J. G.

The influence of temperature on the development of powdery mildew on spring wheats.

Phytopathology 1954 : 44 : 247-51.

Investigations were carried out during a three-year period to study the development of *Erysiphe graminis* var. *tritici* on 15 spring wheats at 16°, 20°, 24° and 28° C under greenhouse conditions. All the susceptible varieties displayed heavy infection on the leaf sheath and blade at the first three temperatures; at 28° C they showed little or no powdery mildew. Varieties and selections regarded as field resistant differed considerably in their reactions at the four temperatures, Hope exhibiting the widest range of response; the leaf blades and sheaths of this variety were resistant at 16° and 20° but moderately susceptible at 24°. Khapli, *Triticum timopheevi* and selections CI 12632 and CI 12633 from (Illinois 1 x Chinese)<sup>3</sup> x *T. timopheevi* possessed good resistance at all temperatures.

2852 DUFF, A. D. S.

Seedling resistance and mature-plant susceptibility of wheat to *Puccinia graminis* found in Kenya.

Nature 1954 : 173 : p. 779.

Until recently seedling resistance to stem rust was invariably found to be associated with mature-plant resistance in wheat breeding in Kenya. The lines 184, 318 and DC x Ceres R46, however, have shown seedling resistance and mature-plant susceptibility to certain forms of rust. Their seedling resistance to other forms has apparently been maintained in the field.

2853 ROHDE, C. R.

A study of the inheritance of the reaction to leaf rust and other characters in triangular wheat crosses.

Diss. Abstr. 1953 : 13 : Publ. No. 6157 : p. 961.

Minn. 11-42-22 (Timstein x Newthatch) and Frontana were crossed with Mida and with

each other. Minn. 11-42-22 contained the following genes for resistance to leaf rust: *L*, determining field resistance to a collection of races; *f*, seedling resistance to race 6, 9, 15, 52 and 126; *g* and *g*<sub>2</sub>, seedling resistance to race 58. In Frontana the presence of seven factors for leaf rust resistance was detected: *A* and *A*<sub>2</sub>, for field resistance; *H* and *H*<sub>2</sub>, for seedling resistance to race 52; *J* and *J*<sub>2</sub> for seedling resistance to race 58; and *i*, for seedling resistance to race 9. Crosses involving Minn. 11-42-22 showed that (1) two factor pairs controlled field reaction to a collection of stem-rust races, and (2) this variety differed from Frontana and Mida with respect to one factor pair for the awned condition.

2854 **ATHWAL, D. S.**

**Gene interaction and the inheritance of resistance to stem rust of wheat.**  
Indian J. Genet. 1953 : 13 : 91-103.

Many introduced wheats, chiefly from Kenya, were tested for their seedling reaction to stem-rust races 15, 15C, 21, 34, 40, 42, 42B and 53, now prevalent in India; a table summarizes the results.

The inheritance of the resistant varieties Gabo and Kenya 117A was studied in crosses with the susceptible Federation 107. A single dominant gene in Gabo controlled resistance to races 15, 21, 34 and 40; resistance to race 42 depended upon two dominant genes, one of which was the same as that conditioning resistance to the other four races; both genes were effective singly in conferring resistance to race 42. Kenya 117A possessed one incompletely dominant major gene for resistance to races 15, 15C, 21 and 40; its resistance to race 42 apparently depended upon this gene and an additional dominant or partially dominant factor. The stem-rust resistance of Gabo was epistatic to that of Kenya 117A. A method of combining two types of physiological resistance involving an epistatic relationship is outlined.

2855 **Neue Weizensorten in USA. (New wheat varieties in the USA).**  
Schweiz. landw. Z. 1954 : 82 : p. 767.

The new early-maturing, rust-resistant variety Knox is described (cf. Abst. 2761).

2856 **New Lemhi wheat rust resistant.**

Idaho agric. Sci. 1954 : 39 : No. 2 : p. 1.

The new variety Lemhi 53 has been produced at the University of Idaho by breeding rust resistance into standard Lemhi.

2857 **ALLARD, R. W. & SHANDS, R. G.**

**Inheritance of resistance to stem rust and powdery mildew in cytologically stable spring wheats derived from *Triticum timopheevi*.**

Phytopathology 1954 : 44 : 266-74.

Inheritance of resistance to the above diseases was studied in two hard red spring wheats, CI 12632 and CI 12633, developed by crossing *T. vulgare* with *T. timopheevi* and by back-crossing twice, followed by eight generations of selfing. Each of these cytologically stable selections possesses a high degree of adult-plant resistance to stem and leaf rust and to mildew, and a necrotic type of reaction to mildew in the seedling stage; CI 12633 is also highly resistant to loose smut. Data from crosses with the susceptible varieties Marquis and Reward indicated that the stem-rust resistance of the two selections depends upon dominant duplicate factors linked with a recombination value of  $14.78 \pm 1.75\%$ . Adult-plant resistance to stem rust and adult-plant resistance to mildew were so closely associated that no certain cases of recombination were detected among 762 F<sub>3</sub> progenies. This result can be explained equally well by any one of three hypotheses: (1) the occurrence of several genes for mildew resistance within the chromosome segment in question; (2) determination of resistance to both diseases by two compound loci, each consisting of a gene for mildew resistance and another for stem-rust resistance; or (3) pleiotropy of genes at two simple loci. Both selections possess a dominant allele for necrotic reaction to mildew in the seedling stage. CI 12632 and CI 12633 are considered to be promising sources of disease resistance.

2858 **SUNESON, C. A.**

**Effect of stem rust on the yield of wheat.**

Agron. J. 1954 : 46 : 112-14.

The effect of stem rust upon the yields of varieties with different levels of genetic resistance was studied during three seasons at Davis, Calif. The yield of the susceptible wheat Baart was reduced by 25 to 46%, compared with the highly resistant Baart 46, obtained by back-crossing; Baart 38, moderately resistant, and also developed by back-crossing, gave only 6 to 20% lower yields than Baart 46 (cf. Abst. 1039). The weak and somewhat variable genetic resistance of Baart 38 has proved sufficient to control the development of natural epidemics in California since 1940: a near-immune reaction to stem rust may not therefore be immediately



necessary in breeding a commercial wheat. Onas 53, released in 1953, gives even greater protection against prevalent stem-rust races than Baart 46; the susceptible Onas 41 exhibited a yield reduction of 39 to 56%, compared with Onas 53.

2859 DUFF, A. D. S.

**A new disease of wheat in Kenya caused by a species of *Pyrenophora*.**

E. Afr. agric. J. 1954 : 19 : 225-32.

The wheat R64 (DC x Ceres), released in 1953 by the Department of Agriculture, Kenya, has been attacked by *P. tritici-repentis*. Data from crop samples suggest the occurrence of varietal differences in reaction to the fungus; Kenya Governor was practically immune.

2860 MCNEAL, F. H.

**Inheritance of stem solidness in a Thatcher by Rescue wheat cross.**

Diss. Abstr. 1953 : 13 : Publ. No. 6148 : p. 959.

With respect to stem solidity, Rescue and Thatcher differed by one pair of major genes and by modifiers. Thatcher showed partial genic dominance for this character. These varieties differed by one pair of factors with respect to spikelet number per ear.

2861 ANDREWS, J. E.

**Winter wheat improvement—streak mosaic.**

Cereal News 1954 : 1 : No. 11 : 4-5.

It is noted that in greenhouse tests at the Cereal Breeding Laboratory, Lethbridge, Alta., *Agroticum* lines have exhibited promising resistance to mosaic. Some of these lines have been crossed with the winter wheat Kharkov, prior to an attempt to transfer this resistance to Kharkov by back crossing. A mite vector of the disease has been identified.

**2862 A report on six years' experimentation with wheat varieties, 1947 to 1952.**

Tech. Bull. Edinb. Coll. Agric. 1954 : No. 10 : Pp. 23.

The results of trials conducted on 34 winter wheats during the period 1947-52 in the east of Scotland are reported. During 1950-52, three trials of 7 spring wheats were also carried out. In addition to tabulated data, notes commenting upon the performance of the 41 varieties are provided.

2863 BJAANES, M.

**Forsøk med vårkveitesorter 1948-52. (Trials with spring wheat varieties 1948-52).**

Forskn. Fors. Landbr. 1954 : 5 : 219-46.

Spring wheat trials during 1948-52 at the

Vollebekk Experimental Farm and at the Møystad, Forus, Voll, Løken and Vågønes Experimental Stations in Norway are described in separate reports from the individual stations and, on the basis of their results, the value and suitability of each variety for a particular district and for the whole country are assessed, yield, earliness, quality and strength of straw being the main criteria considered.

The best Norwegian varieties are Norrøna, Ås II, Trym and Snøgg II [Quick II]. The Finnish variety Söpu and the Swedish wheat Diamant II [Diamond II] are also of value for cultivation in Norway.

2864 EIKELAND, H. J.

**Sortforsøk med vårkveite ved Statens forsøksgard Forus og i lokale forsøk på Vestlandet og Sørlandet i åra 1948-53. (Variety trials with spring wheat at the National Experimental Station at Forus and in local trials in Vestland and Sørland in 1948-53).**

Bondevennen 1954 : 57 : 34-38.

Amplifying the information which will be issued in the 1948-52 report of the Forus Experiment Station, the author gives an account of various spring wheats in Norwegian trials during 1948-53.

Yields of grain and straw, growth period, tendency to lodging and shedding, hectolitre weight, grain size and baking quality are discussed with particular reference to Ås II, the new variety Norrøna (cf. Abst. 216), Diamant II [Diamond II] and the very early varieties Snøgg II [Quick II] and Söpu.

Norrøna, with its high yield and quality of grain and its strong straw, is mentioned as a possible substitute for Diamant II in Vestland and Sørland.

Other varieties discussed include Fram II, Skirne, Trym, Certus, Fylgia II, Drott [King], Svenno, Snøgg [Quick] and D<sub>3</sub>, a stiff-strawed line of Ås II.

For some higher lying regions in Sørland, Söpu is recommended as being the most productive variety tested there and equal to Snøgg II in strength of straw and earliness, while showing less tendency to shedding and possessing grain of good quality.

## OATS

**2865 Forsøg med havresorter 1949-1952. (Trials of oat varieties, 1949-1952).**

Tidsskr. Planteavl 1954 : 57 : 355-58.

In continuation of previous oat trials on different types of soil in Denmark, experiments were

carried out on four Danish and four Swedish varieties, including the five varieties already discussed in *PBA*, Vol. XXII, Abst. 1846. The yields of grain and straw; date of ripening; husk percentage; length of straw; amount of lodging; and hectolitre weight are tabulated and notes are added on the origin and main characteristics of the varieties.

- 2866 HAGBERTH, N. O.  
Nyare havresorter för södra och mellersta Sverige. (**Recent varieties of oats for southern and central Sweden**).  
Weibulls ill. Årsb. 1954 : 49 : 30-31.

The three medium late white oat varieties, Blenda (cf. Abst. 1049) bred at Svalöf, Sis from Tammisto in Finland and Pajbjerg Rex from Denmark, are discussed from the standpoints of their characteristics, performance and suitability for cultivation in different parts of Sweden.

- 2867 SMIRNOV, B. M.  
(**The origin of *Avena fatua* from cultivated cereals and weed grasses**).  
Agrobiologija (Agrobiology) 1954 : No. 1 : 73-82. [Russian].

Conversions of cultivated oat varieties into *A. fatua* var. *vilis* and other botanical varieties of wild oats, and of some wild oat species into others or into cultivated oats are reported from Saratov. The interspecific changes are attributed to changed external conditions such as sowing dates and certain agricultural methods.

- 2868 SOKOLOV, I. T.  
(**Development of new forms in oats**).  
Agrobiologija (Agrobiology) 1954 : No. 1 : 143-46. [Russian].

The varieties Aristata 15, Aristata 7 and Soviet 339 showed great variability in respect of their biological and morphological characters when grown under the climatic and soil conditions of the Ukrainian steppe. New forms of interest for their earliness and high yield have been selected and are under trial at Artemovsk. Some of them are different botanical varieties from the initial material.

- 2869 OŠČENKO, G. N.  
(**Interspecific variability in oats sown in spring or late autumn**).  
Agrobiologija (Agrobiology) 1954 : No. 2 : 65-67. [Russian].

At Persianovka, Rostov province, conversions of the cultivated variety Soviet of *Avena sativa* into (1) *A. fatua* var. *vilis* and (2) *A. nuda* were observed.

- 2870 FREY, K. J., SHEKLETON, M. C., HALL, H. H. & BENNE, E. J.  
**Inheritance of niacin, riboflavin and protein in two oat crosses.**  
Agron. J. 1954 : 46 : 137-39.

Analyses of niacin and riboflavin contents were carried out on the varieties Huron, CI 5298 (Bond x Anthony), CI 3656 (Bond x Iogold) and the  $F_2$  progenies of CI 5298 x Huron and CI 3656 x Huron. The cross CI 5298 x Huron and its parental varieties were also studied with respect to protein content. Niacin content exhibited transgressive segregation in both directions in either cross. In the cross CI 5298 x Huron low content of niacin was dominant. In both crosses, segregation was transgressive for high but not for low content of riboflavin. Low percentage of protein was dominant in the  $F_2$  of CI 5298 x Huron; no transgressive segregation for protein percentage was detected. Each of the characters studied appeared to depend upon a large number of genes. The estimates of average heritability of niacin, riboflavin and protein contents were 50, 49 and 15%, respectively.

- 2871 MIDDLETON, G. K., COFFMAN, F. A., MOSEMAN, J. G. & BELL, F. J.  
**Protein content of certain fall-sown oat varieties.**  
Agron. J. 1954 : 46 : 282-84.

In an analysis of 15 varieties grown at 9 centres in the south-eastern region of the United States during the season 1949-50, highly significant intervarietal differences were found in protein content of the grain; a variety x locality interaction was also detected. High yield was not inconsistent with high protein content. Bond derivatives usually had a high percentage of protein. Varietal differences in protein content were also obtained in tests of 70 varieties and strains from the world collection, grown at three centres in North Carolina during the 1952-53 season.

- 2872 JONES, B.  
**Field planting of some oat varieties observed under ultra-violet light.**  
Proc. Ass. off. Seed Anal. N. Amer. 1953 : 45-49.

Grain examined under ultraviolet rays at the Oklahoma State Seed Laboratory varied in colour from a dark reddish brown to white, depending upon the variety of origin but independent of seed coat colour under natural light. Colour under ultraviolet rays was shown to be a genetically determined character, orange brown being dominant over white; intermediate



shades occur. It is suggested that the varietal purity of grain may be tested by exposure to ultraviolet rays (cf. Abst. 2873).

2873 WEST, D. W.

**Luminescence test of oat varieties.**

Proc. Ass. off. Seed Anal. N. Amer. 1953 : 115-16.

Tests at Iowa State College indicate that exposure to ultraviolet rays is a reliable means of detecting varietal admixtures in oat seed (cf. Abst. 2872). Data on the colour of 45 varieties as observed under ultraviolet rays are given.

2874 AASTVEIT, K.

**Sortforsøk med havre på Sør-Østlandet i perioden 1939-52. (Oat variety trials in Sør-Østland during 1939-52).**

Forskn. Fors. Landbr. 1953 : 4 : 461-81.

This report from the Farm Crop Institute of the Agricultural College of Norway records the origin, characteristics and performance of over 40 varieties of oats bred in Finland, Denmark, Norway and Sweden and compared in 94 trials at the Vollebekk Experimental Farm and in five other localities served by it. Further information on genetic origins is supplied in the bibliography.

Varieties singled out for special mention include Sisu [Courage], Blenda, Örn [Eagle], Sol II [Sun II], Bambu [Bamboo] and the control Guldregn II [Golden Rain II], which averaged 2740 kg. per ha. in grain yield for all experiments. The Finnish variety Sisu, tested in 11 trials during two years, outyielded Guldregn II by 180 kg. per ha., while Sol II, tested in 49 trials, and Örn, in 94 trials, averaged respectively 110 and 100 kg. per ha. more than the control.

Temperature and rainfall requirements of the more important varieties were studied and their apparent effect on varietal performance in a particular locality was noted.

2875 ÅKERMAN, Å.

**Svalöfs vit- och svarthavresorter i försök och i praktiken. (Svalöf white and black varieties of oats in experiments and in practice).**

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : 4-6.

In this outline of oat breeding carried out by the Swedish Seed Association, different varieties are compared with regard to the advances achieved in yield and quality and to their performance in different parts of Sweden and Denmark.

In central Sweden, where black oats are still grown, Svalöfs Stormogul II [Svalöf Great Mogul II] now predominates almost completely, Extra-Klock [Extra-Bell] being still grown only here and there for its earlier maturity and superior quality of grain.

The extremely early black varieties Same and Orion III (cf. PBA, Vol. XVII, Abst. 1170) now predominate in central and northern Sweden.

2876 DERICK, R. A.

**Oats in Canada.**

Publ. Canad. Dep. Agric. 1953 : No. 554 : Pp. 23.

Brief descriptions of 26 varieties commonly grown in Canada are given. In current research, emphasis is being laid on the development of varieties adapted to comparatively small areas; breeding for resistance to diseases, lodging, drought, frost and shattering is being carried out. In early varieties the proportion of husk to kernel tends to be less than in late varieties. The appearance of false wild oats is considered to be due to hereditary changes. Forms intermediate between the normal oat and false wild oat segregate into normal oats, intermediate types and false wild oats.

2877 ZWEIFEL, J. & KELLER, C.

**Résultats d'essais comparatifs d'avoines d'automne. (Results of comparative trials of winter oats).**

Rev. rom. Agric. 1954 : 10 : 9-11.

Of seven varieties tested in three different localities by the Agricultural Experiment Station, Lausanne, Switzerland, during the period 1949-53, Prieuré and Aberystwyth S 172 gave the highest average yields of grain and were the most resistant to lodging. Prieuré was the most winter hardy and Aberystwyth S 147 produced the highest yield of straw, in addition to a good yield of grain.

2878 PENDLETON, J. W.

**The effect of lodging on spring oat yields and test weight.**

Agron. J. 1954 : 46 : 265-67.

Experiments were carried out at the Illinois Agricultural Experiment Station, Urbana, to determine the effects of artificial lodging upon the yield and test weight of Clinton. Plots lodged 90° four days and 45° twenty days after heading yielded 63 and 83% as much as the control plots, respectively; plots subjected to 45° lodging four and twenty days after heading yielded 86 and 97% respectively compared with the controls. The adverse effect upon test weight was also the most severe in the plots lodged early and at 90°. It is suggested that

such data on lodging should be useful in elucidating variety x year and variety x locality interactions in variety tests.

2879 WELSH, J. N.

**History of oat improvement in Canada.**

Cereal News 1954 : 1 : No. 6 : 7-10.

A brief history of oat improvement from 1906, with special reference to breeding for resistance to rusts and smuts, is given.

2880 MARTIN, R. H. & MENGENSEN, F. VON  
**Smut in oats—breeding for resistance.**

Agric. Gaz. NSW 1954 : 65 : 155-57.

An account of methods used in breeding and testing varieties resistant to smut in New South Wales is given. Victoria, Markton, Bond and Ferguson-Navarro are the disease resistant parents usually employed. Acacia, Ballidu and Bunya are described as being resistant to smut and Belar, Brigalow, Dale, Gidgee, Guyra, Lampton, Mulga and Sunrise as moderately resistant.

2881 SIMONS, M. D. & MURPHY, H. C.

**Look what's happening to race 45.**

Iowa Fm Sci. 1954 : 8 : No. 12 : 7-8.

A popular account of the problem of the crown-rust race 45, attacking Bond and Bond derivatives, is given. As the result of testing 600 collections of crown rust from the United States against a new set of differential oat varieties at the Iowa State College, race 45, as identified by the old set of differentials, has been found to represent at least 11 separate races. The old set, consisting of more varieties than the new one, was abandoned in 1951; races identified by the new set are designated by numbers above 200, to distinguish them from races differentiated by the old set.

2882 WELSH, J. N. & JOHNSON, T.

**Inheritance of reaction to race 7A and other races of oat stem rust, *Puccinia graminis Avenae*.**

Canad. J. Bot. 1954 : 32 : 347-57.

Seedling tests indicated that oat varieties possessing the Richland, Green Russian or Hajira type of resistance to stem-rust races 1, 2, 3, 5, 7 and 12 were resistant to the new biotype 7A, but that varieties with the second type of resistance of Hajira, referred to as the Canadian type and effective against races 1-8 and 10-13 (cf. *PBA*, Vol. XXI, Abst. 262), gave a resistant, segregating or susceptible reaction to 7A. Inheritance of stem-rust resistance was analysed in four crosses: 3003 F [Onward x (Anthony x Bond)] x Exeter (Victory x Rusota); RL 1225

[Victoria x RL 524 (Hajira x Banner)] x Ajax (Victory x Hajira); Garry (Victoria x RL 524) x Roxton (Siberian x Joannette); and RL 1574 [(Victoria x RL 524) x Roxton]. The oat 3003 F has the White Russian type of resistance to races 1, 2, 5, 8, 10 and 11. The  $F_3$  data from seedling tests indicated that three genes condition resistance to the various races: *A*, present in Richland and Green Russian and their derivatives and in certain derivatives of Hajira, and governing resistance to races 1, 2, 3, 5, 7, 7A and 12; *B*, derived from Hajira and determining resistance to races 1, 2, 3, 5, 7 and 12 but ineffective against 7A; and *C*, also derived from Hajira and conditioning resistance to races 4, 6, 8, 10, 11 and 13. Varieties such as Rodney, Canuck and RL 1225 presumably contain *B* and *C*, and varieties such as Garry and RL 1574, *A*, *B* and *C*.

**2883 Rust-resistant mutants appear in oats after exposure to radioactive materials.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 26.

At the Brookhaven National Laboratory, Upton, NY, mutants resistant to race 7A of stem rust have appeared in the progeny of plants raised from seed of the oat Mohawk exposed to radiation originating from uranium fission in a nuclear reactor.

**2884 New oat strains resist known races of stem rust.**

What's New Crops Soils 1954 : 6 : No. 6 : p. 26.

Oat lines possessing resistance to races 7 and 8 of stem rust at all temperatures have been bred at the University of Minnesota.

**2885 Waubay and Dupree oats distributed to certified growers in South Dakota.**

What's New Crops Soils 1954 : 6 : No. 7 : p. 26.

Dupree is adapted to the western and Waubay to the eastern regions of South Dakota. Dupree is an early, yellow variety, resistant to heat, race 8 of stem rust and to Victoria blight; Waubay, notable for its stiff straw, is resistant to race 7 of stem rust and to Victoria blight.

2886 SIMONS, M. D.

**The relationship of temperature and stage of growth to the crown rust reaction of certain varieties of oats.**  
Phytopathology 1954 : 44 : 221-23.

Tests were carried out at the Iowa Agricultural Experiment Station to determine the reactions of 11 varieties to race 205 of crown rust at each of four stages of growth, viz. the seedling,



young plant, boot and anthesis stages, using temperatures of 15° and 25° C. With the possible exception of Victoria, the highly resistant varieties showed consistent reactions, as indicated by data on uredial development, at all stages of growth and at both temperatures; these varieties were Landhafer, Santa Fe, Bondvic, Clintafe and Clintland. Except for Markton, the remaining varieties (Appler, Marion, Cherokee and Mo. 0-205) varied in their reactions according to the stage of growth. In all four cases, resistance increased with plant age; this tendency was generally more pronounced at 15° than 25° C. Mo. 0-205, completely susceptible in the seedling stage, exhibited a high degree of mature-plant resistance at both temperatures.

2887 GOTO, S.

**Leaf diseases of oats.**

Diss. Abstr. 1953 : 13 : Publ. No. 6141 : p. 964.

In seedling tests, *Avena trispermia*, Garry, Saia, SD Hulless, Landhafer, Santa Fe and some derivatives of the two last-named varieties were highly resistant to western wheat mosaic virus. Landhafer and Santa Fe are the chief sources of crown-rust resistance now being used in oat breeding in Minnesota. None of the varieties tested as seedlings and in the field exhibited a high degree of resistance to *Septoria avenae*.

2888 EIKELAND, H. J.

Nye folllrike havresortar for Vestlandet og Sørlandet. (**New productive varieties of oats for Vestland and Sørland**). Bondevennen 1954 : 57 : 164-66.

On the basis of the results of trials in the Vestland and Sørland districts of Norway, the performance and characteristics of a number of Norwegian, Swedish, Finnish and Danish oats are compared, with particular reference to yield, earliness, lodging and local adaptation.

Where a very early variety is needed, Hein II is specially recommended for its grain yield and quality.

Sol II [Sun II] and Blenda were classed as superior to Guldregn [Golden Rain], while Bambu [Bamboo] is recommended as the most useful semiearly variety, with as strong straw as Tempo, which it equals in productivity and surpasses in hectolitre weight.

Other trials in recent years at the Forus Experimental Station have included the varieties Rygja, Opus, Minor, Palu, Rex, Regent, Bambu II, Blixt [Lightning], Sisu and Mansholt Major. At Forus the Danish variety Palu (cf. *PBA*, Vol. XXIII, Abst. 208) yielded 600 kg. grain

per dekar on good soil with only 30% of lodging as compared with about 60% for most of the other varieties.

## RYE

2889 DOLGUŠIN, D. A.

**(An experiment on producing rye from an oat plant).**

Agrobiologija (Agrobiology) 1953 : No. 5 : 86-91. [Russian].

Several references are cited from the first half of the last century, describing the conversion of oats into rye by sowing in summer and cutting off all the ears that develop in the autumn. Experiments were set up in 1952 in which seed of Lochow oats, Pallidum 22 barley and DS-166 linseed were sown on 27 May and 5 July and the plants were mown regularly until late October. This treatment, together with autumn frosts, destroyed all but about 50 oat plants; of these, 12 from the May and 5 from the July sowing were lifted in January and placed in the greenhouse; one of the former group differed from the rest in type and proved to be a rye plant. Some of the other plants were stunted in growth and gave no seed, others developed as normal oat plants. In the second group two plants were of the rye type; one of these was pollinated with oats and gave no seed, the other with wheat and gave 1 grain; other ears emasculated and left to open pollination gave sets varying from 0 to 10 grains per ear; common rye plants when emasculated and left under the same conditions set only 1 grain per ear.

2890 ÅKERMANN, Å.

Erik W. Ljung, 15/4 1878-29/10 1953. (**Erik W. Ljung, 15 April 1878-29 October 1953**).

Sverig. Utsädesfören. Tidskr. 1954 : 8-10.

The death of E. W. Ljung is announced. He held the posts of Secretary and Treasurer of the Swedish Seed Association as well as Chief Editor of its journal and was also known for his successful work on rye breeding which culminated in the production of varieties such as Kungs II [King's II], Stjärn [Star], Stål [Steel] and förädlad Wasaräg II [Improved Wasa II rye].

2891 CVIK, I. F. & KUZJMIN, M. M.

**(A six-rowed rye).**

Zemledelie (Agriculture) 1954 : No. 2 : p. 117. [Russian].

At Ljvov, some plants bearing two normal and one underdeveloped floret on each spikelet have been selected from a local population and their

capacity for developing three grains per spikelet improved by Mičurinite methods. The new form, though still in an experimental stage, is interesting for its high yield and resistance to lodging. The 1000 grain weight is 28 g.

## MAIZE

### 2892 ARRUDA, H. V. DE

Precisão dos delineamentos tipo lattice em milho. (**Precision of lay-outs of the lattice type in maize**).  
Bragantia 1952 : 12 : 309-13.

In 51 experiments with maize hybrids, using small plots of 5 or 10 m. at various research stations in Brazil, the gain in efficiency by using lattice designs as compared with random blocks amounted to less than 10% and was only 1.7% at one station.

### 2893 ALLEGRENI, F. & FENAROLI, L.

La Stazione Sperimentale di Maiscoltura. (**The Maize Experimental Station**).  
Pubbl. Staz. sper. Maiscoltura 1953 : No. 75 : Pp. 51.

A general account is given of the activities of the maize experimental station at Bergamo in northern Italy from its foundation in 1920, and it is shown that all the expenses sustained by the state in financing the station, including those of constructing a new station in 1952, have been covered in 4 years by the increased value of the crop resulting from the use of hybrid maize; the yield increases are estimated at from 25 to 30%, yields of the order to 100-120 q. per ha. having become possible with dent hybrids in the Po valley. Efforts are now being made to produce suitable types for the arid zones of central and southern Italy.

### 2894 BIANCHI, A. & MALIANI, I.

Fattori genetici nel tempo di fioritura in un incrocio di *Zea mays*. (**Genetic factors in time of flowering in a cross of *Z. mays***).

Genet. agr. 1954 : 4 : 68-90.

A cross between two American varieties, A96 and K63, which differed by about three weeks in flowering time, was studied. In both parents there was an interval of 1-2 days between the opening of the male and female flowers, whereas in the  $F_1$  hybrids of both direct and reciprocal crosses the male and female flowers opened together. Both types appeared in the  $F_2$ . The actual date of flowering in the  $F_1$  approached that of the early parent A96, though there was a slight tendency for the reciprocal hybrids to approach the female parent more than the male.

The flowering dates in the  $F_2$  formed an asymmetrical curve indicating the operation of polymeric dominant genes for early flowering; the parental limits were not exceeded and the number of genes affecting flowering time is calculated as being at least 3 and possibly 4-5. No evidence of linkage between these factors and characters such as grain colour or height of plant was found.

### 2895 BRINK, R. A. & GREENBLATT, I. M.

**Diffuse, a pattern gene in *Zea mays***.  
J. Hered. 1954 : 45 : 47-50.

A dominant gene termed diffuse (*Df*), partially inhibiting the pericarp and cob pigmentation controlled by alleles of the series *P*, has been found in two stocks of Peruvian origin. Its maximum effect is attained in combination with *P<sup>RR</sup>* for red pericarp and cob. Linkage tests involving reciprocal translocations suggested that *Df* was situated either in the distal portion of the long arm of chromosome 2 or in the long arm of chromosome 4. Relatively large colourless or nearly colourless patches on the kernels did not result from mutation of *Df* but were apparently a purely somatic effect.

### 2896 STADLER, L. J. & EMMERLING, M.

**Problems of gene structure: III. Relationship of unequal crossing-over to the interdependence of *R*<sup>+</sup> elements (*S*) and (*P*).**

Science 1954 : 119 : p. 585. (Abst.).

The abstract summarizes the theoretical assumptions and experimental evidence leading to the conclusion that the apparent modification in the mutation rate of (*S*) subsequent to the mutation of (*P*) may be attributed to unequal crossing-over within the complex *R* (cf. *PBA*, Vol. XXII, Abst. 1873 and Vol. XXIII, Abst. 2631).

### 2897 Co-operative hybrid maize tests in European and Mediterranean countries—1952.

FAO UN, Rome 1954 : Pp. 179.

The results of trials of American and Canadian hybrids and of local varieties and hybrids in 24 countries are reported in full (cf. Abst. 1064). Regional tests of three-way crosses involving inbred lines of European origin were also carried out in nine countries.

### 2898 Report of the Seventh FAO Hybrid Maize Meeting, Belgrade, Yugoslavia 8-13 February 1954.

FAO UN, Rome 1954 : Pp. 93. (Mimeographed).

A survey by R. A. Silow, dealing with the progress achieved in the use of hybrid maize



during 1953 in Europe and the Mediterranean region, was followed by a discussion, opened by M. T. Jenkins, on practical measures for accelerating the expansion of hybrid maize production in the countries concerned.

Tables are given summarizing the results of the cooperative uniform tests carried out in 1953 to study the performance of inbred lines of European and Mediterranean origin in three-way and top crosses. The plans of the Northern and Southern Regional Committees for the 1954 tests are also given. The following topics were then considered: a uniform policy for the release and use of inbred lines; a uniform policy on the designation of hybrids developed in European and Mediterranean countries; uniform minimum seed certification standards for hybrid maize in these countries; labelling of seed of fodder maize; and production, drying and processing of seed.

A discussion on breeding for cold tolerance in maize was opened by E. L. Pinnell, who dealt with the following three main problems, referring to work carried out at the University of Minnesota and elsewhere in the United States: (1) testing established inbreds for cold tolerance; (2) methods of selecting new cold-tolerant lines; and (3) use of cold-tolerant inbreds in hybrid combinations. Subsequent participants in the discussion referred to genetical and environmental aspects of cold tolerance revealed by experience in the Netherlands, Sweden, England and under dryland conditions in Israel; the desirability of standardized procedures of testing techniques, to facilitate the identification of genetic differences, was also considered.

R. H. Andrew surveyed information on *Diplodia* and *Gibberella* stalk rots and smut of maize, referring to American work on the inheritance of resistance, breeding for resistance and to inoculation techniques for selection purposes. E. L. Pinnell described the method of breeding for smut resistance at the University of Minnesota; appreciable progress has been made by classifying material under conditions of natural infection only.

- 2899 JÜGENHEIMER, R. W.  
**Hybrid maize emigrates to the Old World.**  
 Foreign Agric. 1954 : 18 : 63-66.

A concise, popular account of the progress made in the use and development of hybrid maize in European and Mediterranean countries is provided.

- 2900 BÜCHNER  
 Deutsche Hybridmaise? (**German hybrid maize ?**)

Mitt. dtsch. Landw.Ges. 1954 : 69 : 620-21.

The need for breeding hybrid maize adapted to local conditions is emphasized. Most American varieties give unsatisfactory yields under German conditions.

- 2901 SCHÖBER, K.  
 Richtige Sortenwahl bei Silo- und Körnermais. (**Correct choice of silo and grain maize varieties**).

Landwirtschaft 1954 : No. 7-8 : 101-03.

Loosdorfer Silomais [Loosdorf silo maize], Wisconsin 641 AA and Wisconsin 525 are recommended for cultivation in lower Austria for silage and green fodder purposes. In the same region, Wisconsin 355 and Wisconsin 464 outyielded local Austrian varieties by 30%. In trials at Fuchsenbigl, the Hungarian hybrids Martonvásár 1 and 5 outyielded a number of American varieties.

- 2902 PAP, E.  
 Die Züchtung von Hybridmais. (**The breeding of hybrid maize**).  
 Acta agron. 1952 : 2 : 291-307.

An account of the development of hybrid-maize varieties in the USA, Hungary and the USSR is given, special emphasis being placed on current research at the Martonvásár Plant Breeding Station, Hungary.

- 2903 PANELLA, A.  
 Quattro anni di saggi colturali con i mais ibridi americani. (**Four years of cultivation tests of American hybrid maize**).

Ann. Fac. Agr. Perugia 1952 : 8 : 239-62.

In trials carried out in central Italy in 1949, a very unfavourable year, with American maize hybrids and a number of Italian varieties, the hybrids proved later in maturity and only the two earliest, Kingscrost KO and Wisconsin 464, gave yields comparable with the best Italian varieties. In 1951, however, a more favourable year with better rainfall, the highest yield was given by Iowa 4316 with 45.50 q. per ha., followed by the Italian hybrid Insubria 1, Iowa 306 and Insubria 2, and in 1952 Funk's G114 was highest with 47.0 q. per ha. and was followed by Insubria 156 (= Iowa 4316) with 45.3 q. per ha. and Funk's 30 and U32 with 45.2 q.

In parallel tests under irrigation all varieties matured somewhat later and the hybrids in particular gave much larger yields, the best being US 13, together with Maygold 49, US 32

and Insubria 2, all of which gave yields of the order of 60 q. per ha.; the lowest yields were given by the local varieties and early hybrids such as Wisconsin 255, with yields varying from 25 to 35 q. per ha.

- 2904 CONSOLINI, A. & NEGRETTI, E.  
Produzioni maidicole in Lombardia nel 1953. (**Yields of maize in Lombardy in 1953**).

Humus 1954 : 10 : No. 2 : 16-19, 46.

For the benefit of the Italian grower, details are given of the results obtained with different hybrid maizes in the hilly and the low lying parts of Lombardy. The highest producers in the plains and the hills were Funk G/77 and Funk G/30.

- 2905 FENAROLI, L.  
Rapporto sulla sperimentazione maidicola 1952. (**Report on maize experiments in 1952**).

Pubbl. Staz. sper. Maiscoltura 1953 : No. 76 : Pp. 53.

The results of a further year's tests are reported (cf. *PBA*, Vol. XXIII, Abst. 2635). In spite of a bad season, yields of over 100 q. per ha. have been attained from hybrids in the irrigated zone, the maximum being 116.2 q. from Funk G 77 in the Brescia locality.

- 2906 Milho híbrido: o que é e como se cultiva. (**Hybrid maize: what it is and how to grow it**).

Sér. Divulg. Direcç. ger. Serv. agríc., Lisboa 1954 : No. 26 : Pp. 19.

A popular description of hybrid corn is given for the benefit of Portuguese readers. Most hybrids have yielded at least 50% more than the local Portuguese varieties and some over 200% more; they are also more resistant to lodging, drought and diseases, and respond more favourably to heavy manurial dressings. General directions are given for the cultivation of hybrid maize.

- 2907 RUHADZE, L. M.  
(**An experiment on sowing maize from hybrid seed**).

Zemledelie (Agriculture) 1954 : No. 3 : p. 107. [Russian].

In Abkhazia, the  $F_1$  of the cross Abatskaja Želtaja [Yellow Abatskaja] x Adžametskaja Belaja [White Adžametskaja] yielded 7.1 c. more per ha. than Adžametskaja Belaja. In the  $F_2$  the increase in yield amounted to 7.8-14.7 c. per ha.

- 2908 GELIN, O.

Hybridmaj. (**Hybrid maize**).

Weibulls ill. Årsb. 1954 : 49 : 35-36.

In annual variety trials of hybrid maize in Sweden, KF and KS2 did well in 1953 and both can be provisionally recommended to growers; KF, an early to medium early maize, gave a good yield with an abundant set of ears. Further advances in the production of maize hybrids adapted to Swedish conditions are expected from suitable crossing of inbred lines already tested in Sweden. Seed will, however, have to be produced in countries with a more favourable climate.

- 2909 ANDERSSON, G.

Ensilagemajs. (**Maize for ensilage**).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : 29-30.

Until the Swedish Seed Association has succeeded in producing new and better varieties of hybrid maize suitable for conditions in Sweden, the comparatively early ripening Danish variety Eagle Hill and the semiearly American hybrid W464 are again recommended to Swedish growers (cf. Abst. 1969).

- 2910 JUNCKER, F.

7 års erfaringer med majsdyrkning på Overgaard. (**Seven years' experience of maize cultivation at Overgaard**).

Tidsskr. Landøkon. 1954 : No. 3 : 121-39.

This report on further experiments on maize cultivation (cf. *PBA*, Vol. XX, Abst. 1630) in Denmark during 1947-53 contains a section on the performance of 18 American and other hybrids and varieties at Overgaard, with observations on their earliness, resistance to cold, *Ustilago zeae* and wind damage, and their suitability for cultivation under the different climatic conditions in various parts of Denmark.

- 2911 POPOW, G.

Hybridmais zur Körnerproduktion. (**Hybrid maize for grain production**).

Mitt. Schweiz. Landw. Zürich-Qerlikon 1954 : 2 : 65-68.

The Federal Experiment Station at Zürich-Oerlikon recommends the American hybrids Wisconsin 255 and 240 and the Netherlands hybrid Goudster [Golden Star] as being suitable for cultivation in Switzerland. Brief agronomic data on these varieties are presented and factors of importance in the cultivation of hybrid maize indicated.



- 2912 Silomaisversuche mit verschiedenen Sorten und Standweiten. (**Silage maize trials with different varieties and planting distances**).

Mitt. schweiz. Landw. Zürich-Oerlikon 1954 : 2 : 69-84.

In trials at Liebefeld, Switzerland, the American hybrids Ohio M34 and Wisconsin 255, 355 and 464 proved superior in yield and quality of silage and in resistance to drought and lodging when compared with the locally cultivated varieties Rheintaler [Rhine Valley] and Nostrano dell'Isola. The two latter varieties were, however, superior in rate of growth and resistance to cold. Varietal differences in optimum planting distance were noted.

- 2913 La conférence internationale du maïs hybride de Zurich et ses enseignements pour le Maroc (Février 1952). [**The international hybrid maize conference in Zürich and its lessons for Morocco (February 1952)**].

Terre maroc. 1952 : No. 271 : Pp. 20.

The proceedings of the above conference (cf. *PBA*, Vol. XXIII, Abst. 1127) are reviewed with reference to the cultivation of hybrid maize in Morocco. Observations of American hybrids during 1951 led to the conclusion that, although their order of maturity remains the same, early varieties mature later, and late varieties earlier, than under American conditions. In trials conducted at Boulaouane and Rabat, under irrigated and nonirrigated conditions, respectively, United 75, 65, 6, 59, 68, 72 and 67 and Dekalb 1025 gave high yields. The production of single-hybrid and double-hybrid seed well shortly be undertaken in Morocco. It is not considered advisable to cultivate male-sterile lines and hybrids from these lines until more is known about their behaviour under local conditions.

- 2914 LAUBSCHER, F. X., JOSEPHSON, L. M., STEAD, B. & VILJOEN, P.  
**Maize variety trials in the Highveld region.**

Fmg in S. Afr. 1954 : 29 : 129-33, 143.

In trials of 36 hybrids and varieties grown in nine districts the top crosses Early King x K 64 and PP x K 64 gave the highest average yields. The yield of second-generation seed of the latter was still higher than the average yield of the varieties. From 1949 to 1953 all hybrids were superior to the varieties. They had a lower moisture content and less root lodging. In trials of flint hybrids, all were inferior to PP x

K 64. PP x K 64 appeared practically drought resistant in 1951-52. Mic's Success seemed well adapted to the eastern Highveld and Earl Pearl performed best in the Middeveld Irrigation area.

- 2915 MILES, S. R., NEWMAN, J. E. & CRANE, P. L.

**Performance of dent corn hybrids in Indiana through 1952.**

Sta. Bull. Purdue Univ. 1953 : No. 598 : Pp. 44.

Tabulated data on yield, quality and lodging for maize hybrids tested at eleven centres in Indiana over periods varying from one to eleven years are presented.

- 2916 **1953 Illinois corn tests. Variety performance, seed treatment, rate of planting.**

Bull. Ill. agric. Exp. Sta. 1954 : No. 571 : Pp. 32.

Data on yield, stand, resistance to lodging, straw length and moisture content of the grain are presented for 283 maize hybrids tested at five centres, together with information on the incidence of stalk rot at Galesburg and Stewart's disease at Urbana. DeKalb outyielded all other hybrids tested in 1953; those hybrids giving the highest yields during the period 1951-53 are listed. Resistance to drought and lodging must be combined if good results are to be obtained in high plant populations; Hy2 x Oh7 gave the best results under these conditions.

- 2917 JUGENHEIMER, R. W., BAUMAN, L. F. & ALEXANDER, D. E.

**Experimental corn hybrids tested in 1953.**

Bull. Ill. agric. Exp. Sta. 1954 : No. 572 : Pp. 23.

Tabulated data of 163 maize hybrids tested at four centres are presented. Ill. 1277, Nebr. 1626C, Ohio 4808 and Ill. 1897 gave the highest yields in northern, north central, central and south central Illinois, respectively. Hybrids producing the best yields over periods of up to six years are listed.

- 2918 ROSSMAN, E. C.

**Michigan 570—a new corn hybrid.**

Quart. Bull. Mich. agric. Exp. Sta. 1954 : 36 : 386-90.

The new yellow hybrid Michigan 570 [(M14 x Oh. 43) x (L289 x Oh. 5)], released by the Michigan Agricultural Experiment Station, is particularly well adapted to conditions in southern Michigan, where it has outyielded all

other hybrids tested; the hybrid cannot be expected to mature under all conditions in central Michigan. It has good resistance to lodging and is suitable for mechanical harvesting.

**2919 Two corn hybrids released for first time in Nebraska.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 30.

The maize hybrids Nebraska 201 (Experimental 1389A) and AES806 (Experimental 1617A), maturing in 100 and 118–120 days, respectively, have been released. Over a two-year period AES806 produced an average yield of 107 bushels per acre. When compared with 30 other hybrids in the Panhandle area, Nebraska 201 gave the best performance; it is short-growing and bears short husks which permit rapid drying in the field.

**2920 WOODWARD, R. W. & NIELSON, R. F. Hybrid corn trials in Utah.**

Bull. Utah agric. Exp. Sta. 1954 : No. 367 : Pp. 17.

The bulletin summarizes the results of tests carried out on 10 to 44 maize hybrids in Utah during the period 1940–53 to determine grain and silage yields.

**2921 VIEGAS, G. P. & KRUG, C. A. Melhoramento do milho. II. Germoplasma utilizado nos trabalhos de seleção. (Maize breeding. II. Germplasm used in selection work). Bragantia 1952 : 12 : 237–46.**

Further observations (cf. *PBA*, Vol. XV, Abst. 206) on a number of Brazilian and introduced maize varieties have shown the local Catêto among the flint varieties and Armour among the dents to be on the whole better in the S. Paulo state than varieties introduced from abroad. A number of selected lines of Catêto are under observation, some of them having shown superiority to the original Catêto in yield and combining ability; from Tuxpan some promising yellow dent lines have been selected and are being used in crossing. Out of the many varieties and hybrids from the USA, only lines 38–11 and Hy were a success, others being too early in maturity and deficient in straw yield.

**2922 VIEGAS, G. P., KRUG, C. A. & PENTEADO, M. P. Melhoramento do milho. III. Ensaios de híbridos. (Maize breeding. III. Tests of hybrids). Bragantia 1952 : 12 : 247–58.**

Among the yellow flint lines tested for combining ability in three localities in São Paulo, Brazil,

selections from Catêto gave the best results; top crosses from line 483 gave significant yield increases over Catêto and Armour used as controls; high-yielding top crosses were also obtained from certain selections from Creole Yellow Flint, Xavier, Farroupilha and Assis Brasil. In tests of specific combining ability, 81 hybrids were superior to Catêto; several triple hybrids exceeded Catêto in yield and the single cross 483 x 278–1–1 exceeded it in 28 out of 32 cases, with an average excess of 710 kg. of grain per ha. Yields exceeding those of Catêto were produced by 56 double crosses, particularly good results being given by lines 483, 278–1–1, 429–2 and 581; hybrid 3531 exceeded Catêto by 780 kg. in mean yield per ha. and certain others gave higher yields still in certain localities.

In the yellow dents, a number of local selections and lines Hy and 38–11 from the USA were found promising in general combining ability, tested by crossing them with the variety Armour. In tests of specific combining ability line 1896–1 from Krug Yellow gave good single and triple hybrids and double crosses in a number of combinations; for instance, crosses of 1891–1 x 38–11 with single hybrids of Catêto lines gave rise to hybrids which excelled Armour significantly in all yield tests. Other combinations of 38–11 also receive favourable mention.

**2923 VIEGAS, G. P. Melhoramento do milho. IV. Comportamento regional de variedades e híbridos. (Maize breeding. IV. Regional behaviour of varieties and hybrids). Bragantia 1952 : 12 : 259–66.**

Brief descriptions are given of the varieties Catêto, Cristal and Armour, and of the hybrids H3531 and Agrocere (= Minas 1), all grown extensively in the state of São Paulo. In conditions of relatively high rainfall Cristal often exceeded Catêto in yield, otherwise Catêto was superior, though generally inferior to Armour. Hybrid 3531 produced an average of 400 kg. per ha. more than Catêto in the three years 1949–51; Minas 1 in the same years yielded an average of 408 kg. per ha. more than Armour, its best results being given on the more fertile soils.

**2924 ANDRADE SOBRINHO, J. DE & SMITH, E. Produção de sementes híbridas de milho no estado de São Paulo. (Production of hybrid maize seed in the state of São Paulo). Bragantia 1952 : 12 : 267–76.**

The maize hybrids produced by the agricultural research institute at Campinas are yielding some



25% more grain than the varieties previously grown in São Paulo, and the organization of the production of the hybrid seed is outlined.

2925 CORIOLANO, A.

Il Congresso dei Mais Ibridi. (**The Congress on Maize Hybrids**).

G. Agric. Domen. 1954 : 64 : p. 66.

This press report of addresses by Fenaroli, Montanari, Trentin and the Italian Minister of Agriculture at the above congress at Vicenza records research done in Italy on (1) maize hybrids, their production, characteristics and adaptation to various localities, and the prospects of breeding new types; and (2) official measures to promote pure seed production.

The formation of the Italian Society for Plant Genetics (Società italiana di genetica vegetale) was announced at the end of the meeting.

2926 **Growers make first use of male-sterile system for producing seed corn.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 28.

The male-sterile line, W464A m.s., has been released by the University of Wisconsin for the production of hybrid seed without detasseling.

2927 CAPUTA, J.

Observations sur la teneur en eau du maïs-grain en fonction de la date et de la densité des semis. (**Observations on the moisture content of maize in relation to the date and the density of sowing**).

Rev. rom. Agric. 1954 : 10 : p. 21.

In experiments at the Federal Agricultural Research Station, Lausanne, Switzerland, the moisture content of the American hybrids W255 and W270 was found to depend partly upon genetical factors and partly upon date of sowing and density of plant population. The hybrids W270, W255 and W240 are recommended for early sowing in Switzerland, and W255, W240 and CJV5 for late sowing.

2928 ANGULO BUSQUETS, M.

La densidad de plantación y el abonado en el híbrido US-13. (**Plant density and manuring trial for the double hybrid US-13**).

An. Estac. exp. Aula Dei 1954 : 3 : 261-65.

Tests with hybrid US-13 under different conditions of spacing and manuring have shown that the most economical system is 4 plants per m. with a dressing of 750 kg. sodium nitrate per ha., as opposed to the 5 plants per m. usual for Spanish varieties.

2929 BLAKE, C. O.

**Niacin metabolism in the corn seedling : the biosynthesis of trigonelline.**

Amer. J. Bot. 1954 : 41 : 231-38.

Studies on selfed lines of the maize variety Huffman indicated that niacin content is inversely proportional to trigonelline content of the embryo and whole grain. Such an inverse relationship would result if selection for high content of niacin resulted in the simultaneous accumulation of genes limiting the conversion of niacin to trigonelline. Information is given on general relationships between niacin and trigonelline contents in embryos and seedlings.

2930 SHRIKRISHNA HARI TULPULÉ

**A study of pleiotropic genes in maize.**

Amer. J. Bot. 1954 : 41 : 294-301.

Investigations were carried out on the genetics of spontaneous "lemon-white" mutants, characterized by kernels with lemon-coloured endosperm and the production of pure white seedlings. Four recessive and nonallelic genes were each responsible for the lemon-white type, viz.  $lw_1$ ,  $lw_2$ ,  $lw_3$  and  $lw_4$ ;  $lw_1$  and  $lw_2$  exhibited monofactorial ratios;  $lw_3$  and  $lw_4$  behaved as duplicate factors. The locus of  $lw_1$  was situated in the long arm of chromosome 1;  $lw_2$  and  $lw_3$  were both carried by the long arm of chromosome 5; the recombination values for  $pr$  and  $lw_2$  and for  $lw_2$  and  $lw_3$  were 14% and 8%; the precise position of  $lw_3$  could not be ascertained but evidence that it was situated to the right of  $bt$  was obtained. The locus  $lw_4$  was carried by chromosome 4, between  $su_1$  and  $gl_3$ . The modifiers  $l_1$  and  $Cl_2$ , known to affect the expression of albinism in seedlings, had no influence upon the  $lw$  genes. As shown by an analysis of the mutant  $lw_2$ , the lemon-white type was characterized by a quantitative reduction in the endosperm pigments, without any qualitative differences from the normal yellow endosperm. The view is expressed that the  $lw$  genes cannot be truly described as pleiotropic until more information on the early steps in the synthesis of chlorophylls and carotenoids is available; possibly the apparent pleiotropic effects may be traced to an abnormality in plastid development.

2931 VENEZIAN, M. E.

Comportamento di alcuni enzimi nei mutanti clorofilliani di *Zea mays*. (**The behaviour of certain enzymes in chlorophyll mutants of *Z. mays***).

Ann. Sper. agr. 1954 : 8 : 333-36.

An examination was made of grains of maize plants, the pollen of which had been treated with an electromagnetic field; the seeds gave

rise to albino plants, the leaves of which displayed a catalase activity 67.5% below that of normal plants and an entire lack of carbonic anhydrase activity.

- 2932 LONNQUIST, J. H. & MCGILL, D. P.  
**Gametic sampling from selected zygotes in corn breeding.**  
 Agron. J. 1954 : 46 : 147-50.

The principle of Stadler's method of gamete selection of individual plants with superior genotypes from open-pollinated varieties (cf. *PBA*, Vol. XV, Abst. 986) was successfully applied to both South American popcorn and the dent maize Hays Golden in experiments at the Nebraska Agricultural Experiment Station. For each variety the material sampled consisted of families of selected top crosses with the inbred pollen parent of a three-way hybrid. Selection of two related lines for the production of a single cross to replace the inbred parent was aimed at in the case of each three-way cross. The top-cross families were subjected to gamete sampling by outcrossing them with the single-hybrid parent of the corresponding three-way hybrid and testing the outcrosses against this three-way hybrid. Data from comparable test crosses indicated that a greater proportion of gametes with superior germ plasm for yielding capacity and suitable moisture content of the grain at harvesting was obtained from selected top-cross plants (Hays Golden x N 6) than from combinations of N 6 and elite lines.

- 2933 THOMPSON, D. L.  
**Combining ability of homozygous diploids of corn relative to lines derived by inbreeding.**  
 Agron. J. 1954 : 46 : 133-36.

When evaluated for combining ability in top crosses with the single-cross tester L289 x I205, homozygous diploid lines of maize and sweet corn developed by the monoploid method (cf. *PBA*, Vol. XXII, Abst. 2669) did not differ from a group of elite inbreds and another group of relatively unselected inbreds obtained from the same sources. The monoploid method does not therefore appear to possess any special advantage in practical breeding; it is, however, considered to merit attention for special studies or as a new approach in maize improvement.

- 2934 ŠČELOKOVA, Z. I.  
**(Intervarietal hybridization of maize by free selective fertilization).**  
 Agrobiologija (Agrobiology) 1953 : No. 5 : 156-58. [Russian].

Several varieties were allowed to produce seed by open pollination by growing in alternate

rows with a mixture of other varieties of the same grain colour or by growing each plant surrounded by plants of the other varieties. Some varieties produced an  $F_1$  generation showing a significant increase of yield compared with that of the maternal variety; in this case it is assumed that the seed was formed as a result of selective fertilization. Other varieties showed no such increase and it is assumed that no selective fertilization had occurred. Some varieties gave higher yields when the silks were removed, thus increasing the proportion of foreign pollen, others gave the best yields when the silks were left on. The plants from crossed seed of the variety Želtaja Zubovidnaja [Yellow Dent] ripened 4-5 days earlier than the maternal variety. This variety gave yield increases also in the second generation when the seed was produced without removing the maternal silks.

- 2935 NAKAMURA, N.  
**(On delayed pollination of maize).**  
 Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 265-66. [Japanese].

Experiments on induced parthenogenesis in crosses between maize varieties with white or yellow endosperm are reported. Plants originating parthenogenetically were obtained by (1) pollinating some time after silking, or (2) applying X-irradiated pollen. No cumulative effect was obtained by combining these two treatments. The plants thus obtained were diploid.

- 2936 PRINCE, A. B.  
**Effects of nitrogen fertilization, plant spacing, and variety on the protein composition of corn.**  
 Agron. J. 1954 : 46 : 185-86.

Investigations on the maize varieties Dixie 17, NC 27 and Douthit's Prolific in North Carolina indicated that all three of the above factors have an important influence upon the protein composition of the grain.

- 2937 BONNETT, O. T.  
**Development morphology of the vegetative and floral shoots of maize.**  
 Bull. Ill. agric. Exp. Sta. 1953 : No. 568 : Pp. 47.

Investigations on the external appearance and cytohistological characters of developing vegetative and floral shoots of flint and dent and fasciated types are reported. Definite developmental stages were distinguished; in briefly discussing the application of his study the author suggests that information on these stages should facilitate breeding for better adapted



genotypes and the interpretation of results from experiments on the effects of fertilizers and other treatments.

- 2938 WELLHAUSEN, E. J., ROBERTS, L. M. & LENZ, L. W.

**Relation between tassel condensation and ear row number in maize.**

Agron. J. 1954 : 46 : 284-86.

The relationship between condensation in the tassel and ear-row number was studied in 863 plants representing Mexican races. Ear-row number ranged from 8 to 26, the condensation index from 1.00 to 3.45. The two characters showed a highly significant correlation ( $r = 0.48$ ) and were linearly related, in contrast to the curvilinear relationship obtained by Anderson and Brown for corn-belt inbreds (cf. *PBA*, Vol. XIX, Abst. 970). It is suggested that breeders may be able to use the condensation index of the tassel to make general predictions of ear-row number.

- 2939 BRINK, R. A. & BARCLAY, P. C.

**An accessory chromosomal element associated with variegated pericarp in maize.**

Science 1954 : 119 : 577-78. (Abst.).

Medium variegated pericarp depends upon the unstable allele  $P^{vv}$  and an accessory element termed "modulator" which suppresses the pigment-producing action of  $P^{RR}$ ; mutants with light variegated pericarp carry  $P^{vv}$  and are hemizygous for modulator transposed to a locus other than  $P$  (cf. *PBA*, Vol. XXIII, Abst. 1171). A third variegated phenotype, very light, arose as a mutant of light variegated and contained two transposed modulators in different positions. Modulator activates  $Ds$ , thus resembling  $Ac$  (cf. *PBA*, Vol. XXIII, Abst. 5).

- 2940 TEAS, H. J., TEAS, A. N. & CAMERON, J. W.

**Niacin relationships in developing and mature maize endosperms of brittle and related genotypes.**

Cereal Chem. 1954 : 31 : 250-56.

The niacin content of endosperms of the two mutant genotypes, brittle-1 ( $bt_1$ ) and brittle-2 ( $bt_2$ ), and of their normal counterparts was determined at intervals between 14 and 46 days after pollination. From the middle stage of development onwards, both  $bt_1$  and  $bt_2$  endosperms had a higher niacin content than normal ones. In each mutant the niacin content rose rapidly between 14 and 39 days and then decreased. The differences between the mutant and normal types were larger when determined on a dry-weight basis than when estimated per

endosperm. Endosperms of the types  $su_1$  and  $su_1bt_1$  from kernels on the same ear did not differ significantly in niacin content per endosperm; on a dry-weight basis, however, the niacin content of  $su_1bt_1$  was twice as high as that of  $su_1$ .

- 2941 JEFFREYS, M. D. W.

**The history of maize in Africa.**

S. Afr. J. Sci. 1954 : 50 : 197-200.

By means of historical documents and other evidence, the author has traced back the use of names currently or recently employed for maize in several languages. On this basis he concludes that maize was known in west Africa before 1150 AD, and in east Africa and India before the arrival of the Portuguese, and was first introduced into east Africa by Arabs (cf. Abst. 1088).

- 2942 **A preliminary note on a new rust of maize (*Puccinia polysora*) in Nyasaland.**

Nyasaland Fmr. Forester 1953 : 1 : No. 2 : 48-50.

The above rust has now appeared in Nyasaland. Observations in 1953 at the Agricultural Research Station, Lilongwe, and at the Empire Cotton Growing Corporation Station, Chitala, indicated that hybrids were the most and local maize types the least susceptible, introduced varieties occupying a middle position with respect to susceptibility.

- 2943 STOREY, H. H. & RYLAND, A. K.

**Resistance to the maize rust, *Puccinia polysora*.**

Nature, Lond. 1954 : 173 : 778-79.

In investigations at Muguga, Kenya, some varieties and lines from Mexico and Colombia were found to contain rust-resistant individual plants in inoculation tests under greenhouse conditions, the resistant response being of the hypersensitive type (cf. Abst. 311). Forty-two varieties and lines of African origin showed only susceptibility. Resistance depended upon a single major dominant gene. Hybrid progenies classed as susceptible provided evidence suggesting the existence of at least one other gene with a sufficiently large effect to be of possible value in breeding for resistance.

- 2944 LAKSHMI SINGH NEGI

**Ear development and other characteristics of selected strains of maize as affected by European corn borer.**

Diss. Abstr. 1953 : 13 : Publ. No. 5549 : 638-39.

The relationships of different types of reaction

to corn borer with yield and other agronomic characters are analysed. Crosses of resistant inbred lines suffered on the average 2.89% loss in yield as the result of borer infestation, whereas crosses of susceptible inbreds showed a reduction of 9.96%. As indicated by ear development, the corn-borer reactions of the inbred parents were significantly associated ( $r = +0.539$ ) with those of their hybrid progeny.

2945 ANGULO BUSQUETS, M.

La resistencia de líneas de maíz al taladro. (**The resistance to the corn borer of some inbred lines of maize**). An. Estac. exp. Aula Dei 1954 : 3 : 247-52.

Observations on the degree of natural attack by *Pyrausta nubilalis* in 28 inbred lines from the USA showed them all to be more susceptible than the local Spanish variety Hembrilla de Aragón [Aragon Bolt]. The degree of attack was not correlated with time of flowering or height of plant. Differences between the lines were detected in degree of attack and they are tabulated in order of susceptibility.

2946 LOEFFEL, F. A.

**Effectiveness of individual plant selection in *Zea mays* L. for resistance to the European corn borer (*Pyrausta nubilalis* HBN).**

Diss. Abstr. 1953 : 13 : Publ. No. 5544 : p. 638.

Breeding material can be accurately evaluated for corn-borer resistance on an individual plant basis by means of visual ratings of injury, under conditions of manual infestation and provided that the segregating population does not show too wide a range in maturity. Selection for resistance to injury resulting from leaf feeding was more effective in the  $F_2$  of single crosses than in the  $F_3$ . Equal gains were made by selection for resistance to point injury in the  $F_2$  and  $F_3$ .

## BARLEY

2947 FREY, K. J.

**Inheritance and heritability of heading date in barley.**

Agron. J. 1954 : 46 : 226-28.

Crosses made at the Michigan Agricultural Experiment Station showed that heading date was determined by three pairs of genes. Jet and Anoidium were dominant for the same two pairs, Ogaltisu was dominant for one pair, whilst Harlan was recessive for all three. Late heading was associated with the black hull colour in the cross Harlan x Jet and with the smooth awn character in the cross Moore x (Dorsett x

M 49001). Effective selection for heading date can be made in the  $F_2$ .

2948 STRAND, E.

Resultater av sortforsøk med bygg på Sør-Østlandet 1940-51. (**Results of variety trials with barley in Sør-Østland, 1940-51**).

Forskn. Fors. Landbr. 1953 : 4 : 287-318.

During 1940-51 numerous 2-rowed and 6-rowed barleys were compared in 68 trials at the Vollebekk Experimental Farm and in local experiments in Sør-Østland in Norway. The ancestry and interrelationships of the varieties tested are shown in tabular form, with the breeder's name and address and other particulars of possible interest to barley breeders.

In addition to records of yields, earliness and resistance to shattering and lodging, some information is also given regarding varietal differences in rainfall requirements and in the utilization of soil nutrients under varying climatic conditions.

2949 EIKELAND, H. J.

Nye byggsortar. (**New barley varieties**).

Bondevennen 1954 : 57 : 179-81.

The varieties tested in the Norwegian provinces of Vestland and Sørland during 1945-53 included the 2-rowed barleys Goliat, Domen, Ymer and Herta, and the 6-rowed varieties Herse, Varde and Jadar II (cf. *PBA*, Vol. XXIII, Abst. 1200). Vegetation period, lodging, and yield of grain and straw are discussed.

Domen is recommended where very strong straw is required, while Herta, which is higher yielding and has stiff straw and grain of good quality, should be grown where conditions are normal. Jadar II, mentioned as one of the best of the 6-rowed barleys in yield, has also sufficiently stiff straw and grain of good quality; it is recommended for the Jæren district where hardiness is necessary.

2950 FRÖIER, K.

Erfarenheter av Bonuskornets odlingsvärde i Sverige och Danmark. (**Experience of the cultivation value of Bonus barley in Sweden and Denmark**).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : 6-15.

Yield tables, showing the performance of the variety Bonus (cf. *PBA*, Vol. XXIII, Abst. 2688) in competition with varieties such as Maja, Herta, Rika and Ymer during 1949-52, indicate the value of this barley for Danish and Swedish growers.



**2951 Cereal news from Canada. Ontario Agricultural College.**

Cereal News 1954 : 1 : No. 11 : 13-14.

The fodder barley Brant (Stephan x Galore), developed at the Ontario Agricultural College, was recently licensed in Canada. It possesses high yielding capacity, mildew resistance, smooth awns and white aleurone.

**2952 Cereal news from Canada. Wolfe barley.**

Cereal News 1954 : 1 : No. 11 : 15-16.

The early, six-rowed fodder barley Wolfe, recently licensed, was developed from Sanalta x Titan-Montcalm x Olli at the Experimental Station, Lacombe, Alta. It has smooth awns and white aleurone; it is not disease resistant and just prior to full maturity the awns tend to drop. It is recommended for central Alberta, where it has outyielded Olli.

**2953 Cereal news from Canada. Vantmore barley.**

Cereal News 1954 : 1 : No. 11 : p. 14.

Vantmore (Br. 1259-597) was developed from Titan x Vantage at the Brandon Experimental Farm, Man. It equals Vantage in rust resistance but is superior to this parent with respect to yield and resistance to smut, leaf diseases, root rot and lodging. It is expected to replace Vantage in many districts in Manitoba.

**2954 PFEIFER, R. P.**

**Hiland—a better barley.**

Bull. Wyo. agric. Exp. Sta. 1954 : No. 330 : Pp. 8.

**Hiland barley is released for use by Wyoming growers.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 29.

Hiland (Ezond W-3 x Frontier) is recommended for growing under irrigated conditions in Wyoming; in tests under such conditions it has outyielded Frontier by 20.5%. It has semi-smooth awns, short straw, high test weight, an early heading date, and resistance to lodging, shattering and smut.

**2955 Cereal news from Canada.**

Cereal News 1953 : 1 : No. 9 : 16-24.

All the barley hybrids obtained at Charlottetown using N-C13-13 as one parent were resistant to jointworm. In producing the hybrids at Ottawa better results were obtained by delaying pollination until three days after emasculation. Heterosis in buckwheat brought about an increase in the yield and size of the grain.

Cereal breeding work being carried out at Fredericton, Normandin, Ontario and Brandon is also reported.

**2956 TROFIMOVSKAJA, A. JA.**

**(The question of the origin and classification of cultivated barley).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 19-26. [Russian].

Disagreement is expressed with the view of Nikitenko (cf. *PBA*, Vol. XXIII, Abst. 2671) that the six-rowed barleys represent a dying phylum and that they are incapable of cross fertilization; the varieties Poljarnyi 14 [Polar 14] and Pioneer [Pioneer] are named as examples of six-rowed barleys with a high rate of cross pollination and cases are mentioned in which by Mičurinist treatment six-rowed barleys have been transformed into two-rowed and *vice versa*. The species *Hordeum eurasiaticum*, *H. sino-japonicum* and *H. aethiopicum* of Bahteev are also considered invalid, since they give fertile hybrids with the common cultivated barley; in fact the Soviet naked barley Kolhoznyi 7 [Collective Farm 7] was produced by crossing a local Leningrad barley with a naked Ethiopian form and the naked barley GB-18 by crossing a Mongolian hooded barley with an awnless six-rowed Japanese form. Cultivated barley is thus regarded as representing a single species, *H. sativum* Jessen.

**2957 OINUMA, T.**

**(Caryomorphology of cereals. IV. Studies on wild barleys).**

Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 92-104. [Japanese].

An extended version of the paper summarized in *PBA*, Vol. XXIII, Abst. 2672, including a discussion of the probable course of the evolution of the caryotype, is presented.

**2958 CALDECOTT, R. S.**

**Cytogenetic effects of X-ray and thermal-neutron irradiation on dormant seeds of barley.**

Radiation Res. 1954 : 1 : No. 1 : p. 127. (Abst.).

Barley seeds were exposed to doses of 5, 10, 15, 20 and 25 ( $\times 10^3$ ) r and to doses of thermal neutrons ranging from  $2.3 \times 10^{12}$  to  $30.1 \times 10^{12}$  per cm.<sup>2</sup> The frequencies of interchanges and mutations obtained with the highest doses of thermal neutrons were between 1.5 and 2 times greater than those induced by the highest doses of X rays. For both types of radiation, the

frequencies of interchanges and mutations were directly proportional to the dosage.

- 2959 CALDECOTT, R. S., BEARD, B. H. & GARDNER, C. O.

**Cytogenetic effects of X-ray and thermal neutron irradiation on seeds of barley.**

Genetics 1954 : 39 : 240-59.

The effects of treating dormant seeds of barley with X rays and thermal neutrons were compared on the basis of survival and frequencies of chromosomal aberrations in the irradiated ( $X_1$ ) generation and seedling mutants in the  $X_2$ . As indicated by data on seedling height and survival to maturity, seeds exposed to thermal neutrons were much more uniformly affected than X-irradiated seeds. Thermal neutrons caused much less killing (cf. *PBA*, Vol. XXIII, Abst. 1179). For a given survival percentage, the frequencies of chromosomal aberrations and mutants induced by thermal neutron treatment were considerably higher than those obtained with X irradiation. It is suggested that X rays have a pronounced effect on extrachromosomal constituents of the cell and probably cause death as the result of nongenetic injury; the possibility that X rays affect the chromosomes in a cytologically undetectable manner is also considered. For both X rays and thermal neutrons, dose showed an essentially linear relationship with the frequencies of interchanges and seedling mutants. No striking differences in the type of seedling mutant and of chromosome aberrations induced by the two kinds of radiation were detected. As many mutants per interchange in the pollen mother cells were obtained with X irradiation as with exposure to thermal neutrons. Most of the ionization produced in the seeds by thermal-neutron capture was probably caused by protons from N and  $\alpha$  particles derived from boron. The majority of the seedling mutants resulted from deficiencies and position effects; true point-mutations were apparently rarely induced by either type of radiation. In terms of the production of both mutants and chromosomal aberrations, it was calculated that approximately  $3.0 \times 10^8$  thermal neutrons per  $\text{cm}^2$  were equivalent to 1 r. It is suggested that the greater efficiency of thermal neutrons in breaking chromosomes in dormant seeds of barley than in *Tradescantia* microspores (cf. *PBA*, Vol. XXI, Abst. 83) may be attributed to a reduced frequency of production and transport of active radicals in the relatively dry X-irradiated seeds.

- 2960 NISHIMURA, Y. & KURAKAMI, H.  
(**Analysis and synthesis of reciprocal translocations in barley. I.**)  
Ikushugaku Zasshi/Jap. J. Breeding  
1953 : 3 : 45-47. [Japanese].

Lines with 4-membered and 6-membered chromosome rings were obtained by X irradiation. By intercrossing these, further lines with rings of 6, 8,  $4 + 4$  and  $4 + 6$  chromosomes were obtained. Data on the fertility of each line are given.

- 2961 KRAMER, H. H., VEYL, R. & HANSON, W. D.

**The association of two genetic linkage groups in barley with one chromosome.**

Genetics 1954 : 39 : 159-68.

Nine interchange lines were tested for linkage of the interchange points with one or more factor pairs in each of the seven linkage groups of barley. The nine interchange lines were also intercrossed to obtain information on meiotic configurations in the  $F_1$ . The genetic and cytological data led to the conclusion that two linkage groups, III and VI, are carried on the same chromosome, and that each of the remaining five linkage groups involves a different chromosome. Relating their results to the chromosome idiograms proposed by Hagberg and Tjio (cf. *PBA*, Vol. XXI, Abst. 329 and Vol. XXII, Abst. 1912), the authors suggest that (1) linkage groups III and VI are carried by the third longest nonsatellited chromosome (III), (2) VII, the larger of the two satellited chromosomes, bears linkage group V, and (3) chromosome VI contains a linkage group to which no genes have yet been assigned.

- 2962 BOGGIATTO, A. J.  
Estudio citológico de la acción del hexaclorociclohexano como agente poliploidizante en *Hordeum vulgare* L.  
(**Cytological study of the action of hexachlorocyclohexane as a polyploidizing agent on *H. vulgare* L.**)  
Rev. Fac. Agron., B. Aires 1953 : 29 : 121-23.

Germinating seedlings of Cebada Negra [Black Barley] were placed in solutions of the chemical and root tips examined after 19 hours showed clear signs of mitoinhibition; binucleate cells were observed but no actual duplication of chromosome number; this occurred after five days of treatment. No effect was produced when ungerminated seeds were placed directly into the solution of the chemical.



- 2963 ZARUBAĬLO, T. JA. & KISLJUK, M. M.  
(**Action by low temperatures on the vernalization stage as a factor in the origin of forms**).

Agrobiologija (Agrobiology) 1953 : No. 5 : 92-99. [Russian].

The naked barley Kolhoznyĭ 7, which originated from a cross between a local form of var. *erectum* with an Abyssinian form of var. *nigro-nudum*, both early varieties, was subjected to long periods of vernalization at low temperatures for three successive generations; the progeny displayed wide variation both in time of maturity and in morphological features, the number of six-rowed or intermediate and of hulled forms increasing with the degree of lateness. Similar variations were observed, though to a somewhat lesser degree, in the progenies of other plants subjected to the same treatment, e.g. the spring wheats *Lutescens* 62, *Tulun* 70 and *Diamant* [Diamond], the barley *Viner*, and the oat *Orel* [Eagle].

The progenies of the modified plants of Kolhoznyĭ 7 were also examined; those from the two-rowed plants were fairly uniform, those from the multirowed plants were all very late or failed to ear at all when sown in spring, unless subjected to low-temperature vernalization, in which case almost all plants eared at the same time. Some of the progenies of the two-rowed plants showed marked increases in vegetative vigour, an effect also observed in some of the spring wheat progenies referred to above.

- 2964 KAUFMANN, M. L. & SHEBESKI, L. H.  
(**The inheritance of rachis strength in barley**).

Canad. J. agric. Sci. 1954 : 34 : 152-55.

The first set of crosses studied at the University of Saskatchewan, Canada, consisted of the  $F_3$  of OAC21 x Gem and OAC21 x Beecher. Plants classified as homozygotes for resistance to rachis breakage were selected from each of these crosses and their progenies crossed with UM1020, the  $F_2$  hybrids constituting the second lot of material investigated. The rachis is strong in Gem and Beecher and weak in OAC21 and UM1020. Rachis strength was determined by a single gene, weak rachis being dominant. Preliminary investigations indicated that the threshability was not adversely affected by rachis toughness.

- 2965 KISELEVA, N. A.  
(**Variability of furcate barleys under northern Caucasian conditions**).

Agrobiologija (Agrobiology) 1954 : No. 1 : 141-43. [Russian].

Modifications of forked glumes into awned

glumes were observed in some furcate barleys originating from China, Mongolia, Tunis, Canada and Moscow, when grown in the Caucasian foot hills.

- 2966 MATHON, C.-C.

L'analyse des conditions du développement en tant que technique de morphologie expérimentale. Premières expériences sur le genre "*Hordeum*." (**Analysis of conditions of development in relation to experimental morphological technique. Initial experiments with the genus *Hordeum***).

Genet. agr. 1954 : 4 : 23-41.

The literature on anomalies of the inflorescence in barley is surveyed and further information on modifications induced experimentally by a change in sowing time is given (cf. Abst. 1098 and 2797).

- 2967 TROFIMOVSKAJA, A. JA.  
(**Initial material for breeding naked barleys**).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 12-18. [Russian].

Data are given concerning the phasic development of a number of naked barleys in the world collection at Leningrad, and on their yielding ability and other agricultural characters. Special mention is made of a barley from the Ačinskii region of the Krasnojarsk territory; it has a 1000 corn weight of 68.6 g. and up to 87 grains per ear. An awnless naked barley GB-18 selected from crosses between specimens of the collection has equalled Ačinskii in yield although its grains are not so large. Some of the oriental barleys have the densest ears, and those of Dagestan and some from Tadžikistan the highest tillering capacity. The variety Kolhoznyĭ 7 [Collective Farm 7], selected by the Institute of Plant Industry, has stronger straw than other naked barleys and has given yields of over 50 c. per ha. without lodging. Strong straw and good yield are found among the barleys of Dagestan and Ethiopia, and strong straw combined with drought resistance in some of the specimens from Central Asia; the strongest straw of all is found in the variety *Spartan* and in some crosses it transmits this property, though in others, as for instance in crosses with *Viner*, the weak-strawed parent proves to be dominant.

It has been possible from some of the forms in the collection to select naked barleys with up to 40% of gluten in the grain and some specimens

are mentioned in which the properties of the gluten approach those of wheat protein; the hybrid Kolhoznyi 7, from the Leningrad local hulled barley 15616 x the Abyssinian naked barley 3282, contains quite high quantities of gluten and can be used for making macaroni.

2968 PREECE, I. A., AITKEN, R. A. & POTTER, R. T.

**Some aspects of barley composition and malting behaviour.**

J. Inst. Brew. 1954 : 60 : 142-49.

Further experiments (cf. Abst. 1099) have shown that no clear relationship exists between cellulase activity of a barley sample and early malting behaviour; moderate or high cellulase activity, provided it is accompanied by a moderate amount of gum, appears, however, to be associated with satisfactory malting behaviour, as shown by one series of samples of Carlsberg. The autolytic pattern of the grain in respect of gum recovery with advancing time appears to be of value in exposing extremes of initial growth behaviour within a variety, and in distinguishing barleys in which water penetration is difficult. Wort viscosity, found to be of little value in estimating malt modification within a variety, may possibly provide a useful additional means of assessing the wort character of different varieties.

2969 **European Brewery Convention. Proceedings of the Congress, Nice 1953 : Pp. 306.**

Jensen, R. *Preliminary results of comparative ultracentrifugal experiments made on protein fractions isolated from barley samples received from the EBC trials in 1950 and 1951.* (pp. 74-84).

Experiments were carried out at the Carlsberg Breweries, Copenhagen, on samples of (1) Kenia grown in eight countries in the 1950 trials, and (2) Gold, Kenia, Carlsberg and Earl harvested at Nordgården, Denmark, in 1951. Variety played a much less important role than growing conditions in influencing protein composition.

Gilliland, R. B. *The genetics of superattenuation.* (pp. 121-34).

Experiments on hybrids of *Saccharomyces diastaticus* x *S. chevalieri* at the Guinness Brewery, Dublin, have shown that rapid dextrin fermentation or rapid superattenuation depends upon two independent genes, *S* for amylase production and *M*<sub>1</sub> for rapid maltose fermentation, and that for slow dextrin fermentation or

slow superattenuation *S* and *M*<sub>S</sub> (for slow maltose fermentation) are necessary. Strong linkage was detected between *S* and *M*<sub>S</sub>. It is suggested that the parental forms of *S. diastaticus* and *S. chevalieri* had the genotypes *GG M*<sub>1</sub>*M*<sub>1</sub> *M*<sub>S</sub>*M*<sub>S</sub> *SS* and *gsgs m*<sub>1</sub>*m*<sub>1</sub> *m*<sub>S</sub>*m*<sub>S</sub> *ss*, respectively (cf. Abst. 1686); *G* conditions fast fermentation of galactose and its recessive allele *gs* slow fermentation of this sugar; the recessives *m*<sub>1</sub>, *m*<sub>S</sub> and *s* have no action. In the discussion following the paper, L. R. Bishop suggested that attenuation should be studied also from the physiological and cytological points of view; possibly delayed dextrin fermentation could be explained by the liberation of amylase after the death of some of the cells.

Trolle, B. *Comparaison de quatre espèces d'orge sur la base d'analyses de tout ordre, d'une part de l'orge et d'autre part du malt, du moût et de la bière produits de l'orge.* (Comparison of four kinds of barley on the basis of all round analyses, on the one hand of the barley and on the other of the malt, wort and beer obtained from the barley). (pp. 180-89).

Four varieties were grown at Nordgården, Denmark, in 1951, and their chemical composition and malting quality determined at the research laboratory of the Carlsberg Breweries, Copenhagen. The variety Carlsberg gave the best yield, had the highest 1000 grain weight, proved the most suitable for malting purposes and had the lowest nitrogen content. From an economic point of view, based on comparative yields and samples of malting quality, the four varieties were placed in the following order: Carlsberg, Kenia, Earl, Or [Gold].

Preece, I. A. & Mackenzie, K. G. *Enzymolysis of the barley gums.* (pp. 273-84).

A discussion of the value of the autolytic technique in assessing intervarietal and intravarietal differences in malting behaviour is included (cf. Absts. 1099 and 2968).

van Veldhuizen, H. *The Barley Committee of the European Brewery Convention.* (pp. 296-305).

The results of the 1951 trials are discussed; Carlsberg gave the most satisfactory agricultural, analytical and industrial results (cf. Abst. 334). Preliminary data from the 1952 trials show that Carlsberg again gave the highest yields in most trials (cf. Abst. 2970).



**2970 Report of the Barley Committee of the European Brewery Convention 1952 (1954) : Pp. 92.**

A full report of field and malting trials in eleven European countries is given. A new selection of Carlsberg II proved its superiority in yield over other varieties in Belgium, Holland, Bavaria, Finland, Norway and Ireland and was resistant to lodging. Haisa also gave high average yields, but appeared susceptible to unfavourable climatological conditions. Haisa and Isaria II proved almost completely resistant to *Erysiphe hordei*. Analyses of malting quality, including degree of moisture, dry matter content, percentage of nitrogen and protein and proteolytic power are included for each variety tested.

**2971 BISHOP, L. R.**

**Proposed laboratory tests for use in the selection of new races of malting barley.**

J. Inst. Brew. 1954 : 60 : 130-32.

The author suggests that chemical and biological tests should be carried out at three stages of selection, when the following lots of grain are available for sampling: (1) 50-100 g., (2) 5 lb. and (3) 1 cwt. At each of these stages, tests for maltability and malting yield should form the basis of selection, in addition to agricultural characters. Maltability should be assessed by estimations of germinative energy and, except at the first stage, by a malting test early in the season. Evaluations of N content, 1000 corn weight and insoluble carbohydrate, together with the results of malting tests on the fully mature grain at the second and third stages should be used to determine malting yield. The method recommended for estimating germinative energy is described in detail.

**2972 KOLESNIK, I.**

**(Cultivation of winter barley in the Ukraine).**

Socialist. Sel'sk. Hozjaistvo (Socialist Agric.), Moscow 1954 : No. 4 : 22-28. [Russian].

A hardy new winter barley, Odessa 17, has proved the most productive variety in many Ukrainian districts. Other varieties that have yielded well in recent trials include the Transcarpathian land varieties Černovickii [Černovicy] and Zakarpatskii [Transcarpathian].

**2973 Progress Report of the Midwest Barley Improvement Association 1953 : Pp. 69. (Mimeographed).**

Tests at the University of Minnesota have shown Kindred, Pearland and Chevron to be resistant

to race 15B of stem rust and Black Hull-less, CI 166 and selections from Brandon 1136 to be resistant to race 59A. Irradiation experiments with Kindred were carried out in 1952 and some X<sub>2</sub> plants have matured earlier and others possess stronger straw than the original strain. Lines with good yield and straw strength have been obtained from the crosses Brandon 1136 x Kindred, Mars x Montcalm, Minn. 601 x Montcalm and Minn. 601 x Kindred; strains from Minn. 601 x Kindred also possess resistance to spot blotch. B103 and B104, selections from the cross Kindred x Titan made at the North Dakota Agricultural Experiment Station matured two days later than Kindred, were superior in straw strength and possessed resistance to stem rust. Good yields were obtained and breeding to improve the plumpness of the grain is now being undertaken. At the Iowa Agricultural Experiment Station, crosses to incorporate the loose-smut resistance of Anoidium and Trebi into adapted varieties have been made.

Reports of varietal trials and an article on the response of spring barley varieties to different fertilizer treatments and seasonal growing conditions (cf. Abst. 2011) are included.

**2974 Société d'encouragement de la culture des orges de brasserie et des houblons en France. Secobrah. Rapports sur la campagne 1952. (Society for the promotion of the cultivation of brewing barleys and hops in France. Reports for the season 1952) : Pp. 69.**

This report includes the results of trials conducted at the National Agricultural College, Grignon, and at 12 other centres throughout France. Piroline [= Heines 505], Isaria II, Haisa II, Aurore [Dawn] and Rika gave good yields; Isaria II, Bordia, Probstdorf and the hybrid Bethge III x Kneifel had a high malting quality. Rika showed a greater increase in yield than either Busser or Aurore when treated with 30 kg. of nitrogen fertilizer per ha. Research to discover varieties resistant to smut is being carried out; Bordia and Probstdorf appear to be resistant to *Ustilago nigra* but are susceptible to *U. nuda*.

**2975 MILLER, J. D.**

**Variability and inheritance of reaction of barley to certain races of stem rust.**

Diss. Abstr. 1953 : 13 : Publ. No. 5547 : 618-19.

The reactions of seedlings and adult plants to race 15B of stem rust at 70° F or 82° F were

significantly associated with field reactions. The higher temperature gave a better differentiation between susceptibility and resistance. Data from Minnesota 615 x Kindred and Minnesota 615 x Montcalm showed that resistance to 15B is dominant and monogenically determined. Screening of some 250 barleys revealed the existence of adequate sources of resistance to this race. Of the 1042 varieties tested for reaction to race 59A, Black Hull-less (CI 666) displayed outstandingly good resistance. In tests of 1238 barleys for their response to 59A, a highly significant association was detected between seedling reaction at high temperature and field response.

**2976 A report on seven years' experimentation with barley varieties, 1946 to 1952.**

Tech. Bull. Edinb. Coll. Agric. 1954 : No. 9 : Pp. 20.

The results of trials conducted on 23 spring barleys during the period 1946-52 in the east of Scotland are reported. During 1949-1950, three trials of three winter barleys were also carried out. In addition to tabulated data, notes commenting upon the performance of (1) Scandinavian varieties and (2) the Archer type and related varieties are provided.

## MILLETS AND SORGHUMS

**2977 KRISHNASWAMY, N. & RAMAN, V. S. Studies on the interspecific hybrid of *Pennisetum typhoides* Stapf. and Hub. x *P. purpureum* Schumach, II. The cytogenetics of two 22-chromosomed  $F_2$  plants.**

Cytologia, Tokyo 1953 : 18 : 305-31.

Two plants,  $F_2-8$  and  $F_2-3$ , had  $2n = 22$  and  $2n = 22 + 1$  fragment, respectively. They were karyotypically similar to the  $F_1$  ( $2n = 21$ ), except for the addition of a long chromosome in  $F_2-3$  as well as the fragment, and the addition of a medium long chromosome in  $F_2-8$ . The fragment in  $F_2-3$  was approximately two-thirds the size of a short chromosome and had a subterminal centric constriction; it underwent meiotic and mitotic division. At diakinesis,  $F_2-8$  and  $F_2-3$  formed  $8_{II} + 6_I$  and  $1_{III} + 7_{II} + 5_I + 1f$ , respectively. The probable gametic and zygotic combinations giving rise to the two plants are analysed. It is suggested that  $F_2-8$  contained a duplicated chromosome, whereas  $F_2-3$  was both a simple trisomic and a monosomic with a standard type of fragment.

Morphological differences between  $F_2-3$  and  $F_2-8$  could not be correlated with the genetical effects of cytological dissimilarities. Both plants were highly sterile.

**2978 KRISHNASWAMY, N. & RAMAN, V. S.**

**A preliminary note on two chromosome deficient plants in *Pennisetum purpureum* Sch. and their genetic significance.**

Genetica 1954 : 27 : 1-16.

At the Agricultural Research Institute, Coimbatore, Madras, two plants with  $2n = 24$  were obtained among the progeny of a cross between the wild species *P. purpureum* ( $2n = 28$ ) and the amphidiploid ( $2n = 42$ ) of *P. typhoides* x *P. purpureum*. Mitotic and meiotic observations indicated that each of the aberrants was a monosomic for four chromosomes. Morphological differences between the monosomics and their maternal parent were not marked, suggesting that the four univalents compensated for the absence of the corresponding four chromosomes. The possibility of isolating nullisomics and other monosomics by back-crossing the two plants to both parental species is indicated. The *P. purpureum* parent possesses rust resistance; monosomics and nullisomics containing the chromosomes associated with rust resistance but the minimum of chromosomes of the otherwise undesirable wild type should prove useful in breeding rust-resistant economic types.

**2979 SAUGER, L. & BONO, M.**

**Sélection rapide des plantes allogames. Un essai de sélection généalogique sans autopolinisation artificielle sur mil *Pennisetum*. (Rapid selection of allogamous plants. An experiment in genealogical selection without artificial self pollination of *Pennisetum* millet).**

Agron. trop., Nogent 1953 : 8 : 614-38.

The comparative merits of pedigree and mass selection are considered, and it is concluded that the former method gives the more satisfactory results. In experiments conducted at the Bambeby Research Centre, French Senegalese Africa, during the period 1951-53, increases in yield of from 20 to 225% were obtained from lines of *Pennisetum* selected on the basis of hereditary complexes. The selected lines were protected from out pollination by being cultivated in plots surrounded by a tall screen of *Sorghum guineense*.



- 2980 KORNILOV, A. A.  
**(Method of breeding millet for earliness).**  
 Zemledelie (Agriculture) 1954 : No. 2 : 93-98. [Russian].

At the Kalinin breeding station, a new millet has been obtained from a cross between Dolinskoe 103 and Dolinskoe 155/35 that had segregated for earliness in the  $F_1$  and  $F_2$  when exposed to photoperiods of more than 18-20 hours a day. The new hybrid matures earlier than Dolinskoe 155/35 and has a longer and more productive panicle.

- 2981 RATNASWAMY, M. C.  
**Note on the presence of branched stigmas in *Pennisetum typhoides*, Stapf and Hubbard.**  
 Madras agric. J. 1954 : 41 : 43-44.

Pistils with three or four stigmas in some spikelets of MS 5965/6-2 and MS 6355/6-1 are reported from Coimbatore. Selfed progeny of these types showed the same peculiarity.

- 2982 LYSOV, V. N.  
**[Agrobiological classification of common millet (*Panicum miliaceum* L.)].**  
 Trud. priklad. Bot. Genet. Selekc. (Bull appl. Bot. Gen. Pl.-Breed.) 1952 : 29 No. 3 : 112-27. [Russian].

A weed form found in fields of cultivated millet is described as a new species, *P. segetale*; it is regarded as a case of interspecific conversion. Some unsatisfactory features in previous classifications of the species *P. miliaceum* are pointed out, and a new classification is presented, based on a study of over 5000 specimens in the world collection. Two main groups are established, *effusum* and *contractum*, and within these the varieties are arranged according to ecotypes.

- 2983 VARENICA, E. T.  
**(Cultivation of *Setaria*. An agrobiological account).**  
 Zemledelie (Agriculture) 1954 : No. 2 : 73-82. [Russian].

Reference is made to forms resistant to *Ustilago* which have recently been selected in the USSR from some Chinese material.

- 2984 QUINBY, J. R. & KAPER, R. E.  
**Inheritance of height in sorghum.**  
 Agron. J. 1954 : 46 : 211-16.

Studies at the Texas Agricultural Station of crosses involving 11 varieties have shown dwarf-

ness to depend on the cumulative effect of the recessive genes  $dw_1$ ,  $dw_2$ ,  $dw_3$  and  $dw_4$ . The genetical constitution of a wide range of varieties in respect of these factors is given. The effect of a single gene upon height varies from 10 to 100 cm. and depends partially on the number of leaves produced, the time to maturity and the presence of modifying genes. Modifying genes have approximately the same effect as one homozygous recessive. Studies of heterozygous plants indicated that tallness was only partially dominant. The gene  $dw_3$  appeared to have the highest rate of mutation to the dominant state.

- 2985 **Remove red stain.**  
 What's New Crops Soils 1954 : 6 : No. 7 : p. 23.

Hybrids between broom corn and sorghum have been used to develop broom corn varieties free from red stain.

- 2986 WEBSTER, O. J.  
**Hybrid sorghum may soon be reality.**  
 Neb. Exp. Sta. quart. 1954 : 2 : No. 4 : 10-11.

Recent achievements and current projects of sorghum breeding at the Nebraska Agricultural Experiment Station are briefly described in a popular manner. Hybrid grain sorghums, produced with the aid of cytoplasmically male-sterile lines, are to be tested in the field during the 1954 season. The development of hybrid forage varieties is also under way; seed of such hybrids will be produced on short-growing plants suitable for combine harvesting, but the  $F_1$  hybrids will consist of tall plants giving the maximum yield of forage. Other current projects include: (1) transference of the character of low prussic acid content from a Wisconsin selection of Sudan grass to forage sorghums cultivated commercially in Nebraska; (2) development of grain types low in prussic acid content; and (3) use of African introductions in breeding for increased carotene content of the endosperm, larger size of seed and midge resistance.

- 2987 **Grain sorghum hybrids are now in prospect, plant breeders believe.**  
 What's New Crops Soils 1954 : 6 : No. 6 : p. 23.

The Lubbock Experiment Station, Texas, has reported the discovery of two types of male sterility in sorghum by which hybrid seed can be produced economically.

## RICE

- 2988 Documentação sobre o arroz. Lista mundial, preliminar, de organismos e periódicos. (**Documentation on rice. Preliminary world list of institutions and periodicals**).

Com. Reg. Comérc. Arroz, Lisboa 1954 : Pp. 28. (Mimeographed).

The list gives the names of institutions in different countries of the world where investigations on rice are being carried out, with indications of the name of any publications they may issue.

- 2989 CHAUDHURI, S. D. & SEN, J. L.  
**Correlation of quantitative characters in paddy.**

Pakist. J. Sci. 1953 : 5 : 142-44.

Correlations were determined for the local aman or deep-water winter rices and boro or spring-harvested types at the Deep Water Paddy Research Station, Habiganj, Assam. In both aman and boro, inverse relationships between plant height and tiller number and between panicle length and tiller number were detected, whereas height was positively correlated with panicle length and duration of flowering. Negative or positive associations are reported for a number of other characters studied in either boro or aman.

- 2990 DE BENI, U.  
Contributo alla risicoltura della "Produttori Sementi" di Bologna. (**The contribution of the firm "Produttori Sementi" of Bologna to rice cultivation**).

Riso, Milano 1954 : 3 : No. 4 : 21-24.

A brief account is given of the work of the firm in producing new varieties of cereals. In rice breeding one of its achievements is the creation of two new varieties by selection from Balilla, both distinguished by superiority in yielding capacity and one, with more compact panicles, by even greater resistance to lodging than Balilla itself. By rigorous selection pure stocks of the varieties Rinaldo Bersani and Arborio have been maintained.

- 2991 ANSORENA Y SÁENZ DE JUBERA, A. DE  
Las variedades de arroz cultivadas en España y los trabajos de la Estación Arrocera de Sueca hasta el año 1952. (**The varieties of rice cultivated in Spain and the work of the Rice Station at Sueca up to the year 1952**). An. Inst. nac. Invest. agron., Madr. 1954 : 3 : 89-291.

An historical account of the rice varieties introduced into Spain is given together with a report of the activities of the experimental station at Sueca. Observations have been made on the behaviour of a large number of varieties, many of them introduced from abroad. In 1952, flowering was earliest in the variety Precoz Chile [Early Chile], which was followed by Sollana and Stirpe 136 [Strain 136]; the hybrids Bombilla x Sollana and (Insen x Tremesino) x Alberique were also distinguished by their earliness. The highest grain yields were given by the varieties Puebla Larga [Long Seed], Balilla x Benlloch and Pals, with 6000 kg. per ha. or over; grain quality was best in Balilla x Bomba and the largest grains were observed in Bersani, (Insen x Tremesino) x Alberique and Balilla x Bomba. Other varieties considered of special interest for Spanish conditions or as parents are Chinez, Rizzoto, Sesia, Stirpe 705 [Strain 705], Fuzisaka, Norin 1, Pierrot, Americano 1600, Arborio, Rinaldo Bersani, Ottantadue [Eighty-two], Victoria FA and Balilla; reference is made to Arong, Chubai 18 and Taichu 65 as of possible interest for resistance to salinity, Precoz for its earliness and Kissin for its tillering capacity. Several Spanish varieties are mentioned for their disease resistance, Beltrán and Sollana for earliness, Pegonil 15 and 21 for adaptation to high altitudes, Bombán and Bomba for grain quality and Bombilla for its combination of earliness, disease resistance and grain quality. Furthermore, Precoz verde [Green Early], a selection from Hokkaido x Precoz Amarillo [Yellow Early], is also distinguished by strong straw, high tillering capacity and yield of grain, and several good selections of it have been made. Descriptions are given of the several generations from  $F_1$  to  $F_{22}$  from a large number of crosses and of the methods used at the station in making the selections. Two parallel methods are being applied, one in which selection is exercised from the  $F_2$  onwards, the other in which bulk reproduction is effected until the  $F_6$  or  $F_7$ , when selection is started.

A certain number of observations on the inheritance of characters have been made. For instance in the cross Hokkaido x Precoz Amarillo, the green straw and red tip of the former parent were shown to be single dominants to the yellow of the latter. The  $F_1$  plants of Cano x Early Prolific flowered later and over a longer period than Cano, the earlier of the two parents; on the other hand the  $F_1$  of  $DH_1$  x Cano was earlier than either of the parents and Early Prolific x  $DH_1$  considerably later than



both parents. Segregation in flowering time occurred in (Balilla x Bombilla F<sub>1</sub>) x Balilla and certain other hybrids.

An analysis is given of the chief botanical classifications of the species *Oryza sativa* and descriptions are given of the botanical and agronomic characters of the main varieties at present being grown in Spain, including indications of their origin, time of maturity, resistance to diseases and pests, yield and grain quality. Similar descriptions are given of certain newer varieties and some that are still under trial. In 1952, 90% of the rice area of Spain was sown with the four varieties Colusa x Nano, Balilla, Precoz verde and Benloch. The first is the most popular of all, and has yielded over 7000 kg. per ha. in experimental fields; it has short straw, tillers well, and gives short, broad grain of extremely good milling quality. The variety Beltrán is extending in the Ebro region because of its resistance to fungal attack, and Stirpe 136 is popular in the Valencia region for the same reason, together with its good yield and attractive grain.

- 2992 SHEN, T. H. & KUNG, P.  
**Rice production and improvement in Taiwan.**  
News Lett. FAO Internat. Rice Comm. 1954 : No. 9 : 4-17.

This article has been condensed from a paper read before the Eighth Pacific Science Congress, held at Manila, Philippines, during November 1953. It includes a survey of the types grown, breeding work, past and present systems of seed multiplication, and the diseases and insects attacking the crop and their control by the use of resistant varieties and other measures.

- 2993 LOVE, H. H.  
**Rice improvement in Thailand.**  
Foreign Agric. 1954 : 18 : 25-30.

Evaluation and selection of the 1200 varieties obtained from different parts of the world is taking place. F<sub>1</sub> seeds of hybrids made for Thailand at Cuttack were received and the F<sub>2</sub> is being studied.

- 2994 HAYES, H. K.  
**A cooperative program for rice improvement in the Philippines.**  
News Lett. FAO Internat. Rice Comm. 1954 : No. 9 : 1-4.

The cooperative project of rice improvement undertaken by the College of Agriculture at Los Baños and by the Philippine Bureau of Plant Industry is outlined. Varietal tests and observational trials on lowland and upland rice

have been initiated. Breeding nurseries consisting of F<sub>2</sub> progenies of crosses between *indica* and *japonica* rice, made at the Central Rice Research Institute, Cuttack, India, have been established with a view to selecting improved upland and lowland types.

- 2995 OKA, H., CHANG, T. T. & HONG, M. S.  
**Reciprocal translocation in rice.**  
Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 87-91.

Investigations were carried out on four partially sterile strains derived from X-ray treated material. Observations on segregation for sterility and fertility and on quadrivalent configurations suggested that sterility was attributable to a reciprocal translocation in three of the strains. In one, XA-2, showing typical rings and chains of four, the length of the translocated segments was calculated to be approximately two-thirds of an arm of a chromosome. In strain XB-1, quadrivalents were observed but these did not include any rings or chains; the translocated segments were therefore considerably shorter than in XA-2. Strain XB-2 exhibited no quadrivalents, but the mode of the segregation of its sterility, when selfed and when back-crossed to the original variety, was in accordance with that expected from a translocation heterozygote.

- 2996 OKA, H.  
**(Studies on tetraploid rice. I. Technique of colchicine treatment for rice).**  
Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 227-32. [Japanese].

The best results were obtained by germinating grains on damp sand in a dark incubator and applying 3% colchicine in lanolin or a 0.1% aqueous solution to the first node. Data are provided on the number of tetraploid strains obtained from 120 eastern Asiatic varieties.

- 2997 HSHEH [HSIEH], S.-C.  
**(Studies on the behaviour of the chromosomes in tetraploid rice).**  
Nungyeh Yenchiu/Agric. Res., Taiwan 1952 : 3 : No. 2 : 1-15. [Chinese].

Meiosis was studied in the pollen mother cells of colchicine-induced tetraploid strains of a series of rice varieties from various Far Eastern sources, and in the cells of some hybrids between these strains. The number of quadrivalents varied with the strain; there were generally more in the autotetraploids than in the hybrids. There were also fewer univalents in the hybrids

than in the autotetraploids. Secondary pairing was noted between homologous bivalents in both the autotetraploids and hybrids; the frequency was rather greater in the former than in the latter.

2998 OKA, H., LU, Y.-C. & TSAI, K.-H.

**Phylogenetic differentiation of the cultivated rice plant. III. The responses to day-length and temperature and the number of days of growth period.**

Nungyeh Yenchiu/Agric. Res., Taipei 1952 : 3 : No. 4 : 79-94.

The responses of 163 varieties of eastern Asiatic origin to day length and to temperature were investigated at the Taiwan Provincial College of Agriculture by observing the effects of different times of sowing upon heading dates. Response to temperature was studied in 82 varieties insensitive to day length. The 163 varieties fell into two groups, showing a sensitive and insensitive reaction to day length, respectively. Degree of sensitivity and the critical day length, and, in insensitive varieties, duration of growth period (calculated at 25°C) were closely related to latitude. Temperature responses bore no definite relationship to latitude, but the continental and insular groups exhibited some difference (cf. *PBA*, Vol. XXII, Abst. 2746); rices of the former group were usually characterized by a higher rate of acceleration in general growth for a rise of 1°C and a lower rate of hastening flower-bud formation for this temperature rise than varieties of the latter group.

2999 OKA, H.

**(Genetical analysis of intervarietal hybrid sterility in rice and certation due to certain combinations of genes controlling the gametes. Phylogenetic differentiation of cultivated rice. VIII).**

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 3 : 23-30. [Japanese].

The inheritance of partial sterility was analysed in direct and reciprocal crosses involving various combinations of two or more of the following varieties: U-ku-tsing-you, Peh-kuh and Liutou-tu, from Taiwan; and Kinoshita glutinous rice and Kisshin, from Japan. Sterility appeared to be determined by two sets of duplicate alleles,  $S_{1s1}$ ,  $S_{2s2}$ ,  $T_{1t1}$  and  $T_{2t2}$ , the double recessive combinations being sterile.  $S_1$  and  $T_1$  appeared

to be linked. Differences between some of the direct and reciprocal combinations are explained on the supposition that pollen carrying two duplicate dominant genes is at a competitive disadvantage to pollen carrying only one such dominant gene.

3000 OKA, H.

**(The influence of intervarietal hybrid sterility on segregation. Phylogenetic differentiation of cultivated rice. IX).**

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 3 : 31-39. [Japanese].

A theoretical analysis of the disturbed segregation ratios to be expected when a factor pair *Aa* is linked with one of the sterility genes already described by the author (cf. Abst. 2999) is presented. By way of confirmation, data are given on the segregation of glume pigmentation and sterility in the crosses Hakukaku [White Husk] x Boegi-inda and 70<sup>a</sup> som cau x Kani-runga, and of endosperm consistency and sterility in Kinoshita glutinous rice x Hakukaku.

3001 OKA, H.

**Phylogenetic differentiation of the cultivated rice plant. II. Intervarietal hybrid sterility.**

Nungyeh Yenchiu/Agric. Res., Taipei 1952 : 3 : No. 1 : 50-63.

Approximately 120 varieties originating from different parts of eastern Asia were each crossed with seven test varieties and the pollen fertility of the  $F_1$  hybrids was determined. A cross was graded as fertile (+) or sterile (−) according to whether the percentage of normal pollen exceeded or did not reach 87.5%; thus the reaction type of a variety could be represented by seven + or − signs. Of the 128 possible reaction types, 31 were found; these could be classified into two main groups, I and II, corresponding to the continental and insular groups respectively (cf. *PBA*, Vol. XXIII, Abst. 2746). Groups IIa and IIb were respectively equivalent to the tropical insular and temperate insular groups previously distinguished. Sterility is regarded as genetically determined, at least one dominant allelomorph of two duplicate factors being essential for the viability of a gamete. Assuming that changes from the dominant to the recessive condition have occurred, classification for reaction type with respect to hybrid sterility provides an indication of the phylogenetic differentiation of varieties.



3002 OKURA, E.

**Studies on the classification of the Formosan local rice varieties according to the difference of sexual affinity. With a brief note on a specially cultivated variety *Ammiah* in Northern Formosa.**

Biol. J. Okayama Univ. 1952 : 1 : 90-102.

Crosses of 125 local Formosan varieties with indicator varieties of known sexual affinities were effected. On the basis of  $F_1$  data on seed setting, supplemented by observations on pollen fertility, the 125 varieties were classified into three groups with respect to cross compatibility, as follows: (1) a few varieties of the *japonica* type, (2) most of the varieties tested, these belonging to the *indica* type, and (3) five varieties whose hybrids with the indicator rices used in the differentiation of (1) and (2) gave neither a high nor low seed set.

Genetical evidence was obtained of a relationship between the variety *Ammiah*, cultivated because of its strong capacity to recover after typhoon conditions, and the wild rice *Oryza formosana*.

3003 MISRO, B. & MISRO, S. S.

**Dominant inhibitory factor for awning in rice (*Oryza sativa*).**

Curr. Sci. 1954 : 23 : 161-62.

At the Central Rice Research Institute, Cuttack, India, the cross between C28-16, an awnless *indica* type from Burma, and Aikoku, an awned *japonica* rice from Japan, provided evidence of a dominant factor, *Ian*, inhibiting awn development. It is postulated that C28-16 and Aikoku have the genotypes *an an Ian Ian* and *An an ian ian*, respectively, *An an* representing a gene pair for the awned *vs.* the awnless condition.

3004 ČAIKA, Z. A.

**(Occurrence of red grains in the panicles of white-grained rice).**

Agrobiologija (Agrobiology) 1954 : No. 2 : 68-70. [Russian].

Experiments at Astrahanj suggest that the occurrence of coloured grain is not due to cross pollination. Irrespective of whether or not the material was bagged, white seed of Kendzo, Dichroa 213 and Vros 3716 produced only white grain, while red seed selected from Dichroa 213 bore red grain in the central portion of the panicle and red, pink, green or white grain at the ends. Variability in respect of grain colour was also found in the progeny of seed of Dichroa 213 selected for pink or green colour. A red-grained form selected from Kendzo produced only white grain.

3005 PORTÈRES, R.

La variation comparée dans les espèces *Oryza sativa* L. et *O. glaberrima* Steud et l'origine hybride intrajordanienne de la plupart des formes cultivées de la première espèce. (**Comparative variation in the species *O. sativa* L. and *O. glaberrima* Steud. and the intra-jordanian origin of the majority of cultivated forms of the first species).**

Rev. Bot. appl. 1947 : 27 : 151-55.

An analogy is drawn between the phylogeny of *O. sativa* and *O. glaberrima* and an attempt made to reclassify the cultivated varieties of the latter subspecies on the basis of the morphology of their spikelets and caryopses. The hybrid origin of different varieties of *O. sativa* is discussed and reasons for the comparative paucity of jordanons in *O. glaberrima* are suggested.

3006 MATSUSHIMA, S. & YAMAGUCHI, S.

**(Studies in crop science in respect of forecasting the yield of rice. I. The application of crop science to forecasting the yield of rice in the light of the annual variation in the yield components).**

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1954 : 21 : 219-20. [Japanese].

In order to expedite yield forecasts, the authors have calculated the annual variation in (1) number of panicles per unit area, (2) number of spikelets per panicle, (3) percentage grain set, and (4) 1000 grain weight, on the basis of the behaviour of nine varieties at the Konosu experimental station. The annual variation is greatest for number of panicles per unit area and declines according to the order in which the yield components are cited above. A strong negative correlation ( $r = -0.80$ ) exists between the number of panicles per unit area and the coefficient of variation for this character.

3007 MATSUSHIMA, S., YAMAGUCHI, S. & OKABE, T.

**(Studies in crop science in respect of forecasting the yield of rice. II. The relations between the yield of rice and the yield components and between the components themselves).** Nihon Sakumotsugaku Kai Kiji (Proc. Crop. Sci. Soc. Japan) 1953 : 21 : 221-22. [Japanese].

Further to their first paper on the yield components of rice (cf. Abst. 3006), the authors ascertained that (1) a highly significant correlation

subsisted between yield and number of panicles per unit area, irrespective of vegetative period; (2) the correlation coefficient between yield and number of spikelets per panicle was high for early varieties only; (3) the correlations between yield on the one hand and percentage grain set and 1000 grain weight on the other were strongest for late varieties.

- 3008 MATSUSHIMA, S. & MANAKA, T.  
(Studies in crop science in respect of forecasting the yield of rice. III. Curves representing the increase in tiller number in rice varieties with reference to earliness and their relevance to forecasting the number of panicles).

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 223-24. [Japanese].

Continuing the line of research summarized in Absts. 3006 and 3007, the authors show that the modes of the curves for tiller number coincide whether the variety be early or late. The ratio of panicle number to tiller number is highest in early varieties (72-79%) as compared with 62-66% for late varieties.

- 3009 TSUNODA, S.  
(Comparison of the rice varieties suitable for fertile or for hungry land. On the nitrogen content and some other quantitative characteristics).

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 209-10. [Japanese].

Data are provided on the earing date and dry-matter and nitrogen contents of ten Japanese varieties adapted to rich soils and ten suitable for poor soils. Each variety was grown (1) with, and (2) without, a nitrogenous fertilizer. The varieties suitable for fertile soils tended to be shorter and have a higher proportion of nitrogen in the dry matter. They tillered more profusely in response to nitrogenous fertilizers.

- 3010 IKE, T.  
(Studies on salt-resistant varieties. I. On the relevance of the length of the heading period to the avoidance of salt injury).

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 243-44. [Japanese].

Since the concentration of salt in Japanese rice fields where salinity is a problem tends to

increase towards the end of the growing season, it may be feasible to reduce salt injury by growing early varieties.

- 3011 IKE, T. & WATANABE, S.  
(The influence of lodging on the development of rice stem rot).  
Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 247-48. [Japanese].

Artificially lodged rice is more susceptible to stem rot than standing rice. The varieties most susceptible to the disease when lodged are usually those that are least resistant when upright.

- 3012 HASHIOKA, Y.  
(The resistance of rice variety groups to *Cochliobolus miyabeanus* and yellow dwarf. Studies on breeding rice for resistance to diseases. VI).  
Ikushugaku Zasshi/Jap. J. Breeding 1952 : 2 : 14-16. [Japanese].

Tests on a collection of some 300 varieties for resistance to the above two pathogens were carried out in Taiwan in 1946-48. Resistance to *C. miyabeanus* was found in *indica* rices from a wide range of sources. In the case of yellow dwarf, resistance is chiefly to be found in tropical varieties, though many tropical varieties are susceptible. Crosses between temperate and tropical varieties have shown that resistance to yellow dwarf is heritable.

- 3013 CASATI, S. R.  
Esperienze sulla resistenza di alcune razze di risone al *Fusarium moniliforme* Sh. (Experiments on resistance of certain rice varieties to *F. moniliforme* Sh.).  
Riso, Milano 1954 : 3 : No. 5 : 14-17.

Tests in the Italian provinces of Bologna and Vercelli showed the varieties R77, Stirpe 136 [Strain 136] and Ardizzone to be among the most resistant and Arborio the most susceptible.

- 3014 KAWAMURA, E. & ONO, K.  
(Studies on the resistance of foreign rice varieties to blast).  
Noji Shikenjo Iho/J. nat. agric. Exp. Sta. 1948 : 4 : 13-22. [Japanese].

A comparative histological study of the reaction of varieties (1) resistant and (2) susceptible to *Piricularia oryzae* is presented. The resistant varieties used were the Southern form Kararato and the Chinese variety Kuan-yin-hsien [Kuanyin nonglutinous rice]. The resistant varieties had smaller lesions than the susceptible



types and their cells reacted more rapidly to invasion. Resistance was also associated with a reduced tendency for the cells to collapse following infection.

- 3015 PADMANABHAN, S. Y. & GANGULY, D.  
**Relation between the age of rice plant and its susceptibility to *Helminthosporium* and blast diseases.**

Proc. Indian Acad. Sci. 1954 : 39 : Sect. B : 44-50.

The influence of age upon reaction to *Helminthosporium oryzae* was studied in the resistant rice T141 and susceptible varieties Benibhog and T1145, artificially infected in experiments at the Central Rice Research Institute, Cuttack, Orissa. Susceptibility increased with age; the relative susceptibility of the varieties remained unaltered when plants of the same age were compared. In field experiments on reaction to blast (*Piricularia oryzae*), using the moderately susceptible variety T1145 and highly susceptible Co. 13, susceptibility decreased with age.

- 3016 KÁLLAY, K.  
**Odstránit' chorobu hnednutia ryže (bruzone). [Growing rice free from blast (brusone)].**

Za socialist. Zeměd. 1954 : 4 : 356-59.

The breeding of varieties such as Coda and Kendzo, which combine resistance to blast with good quality grain and high yield, is advocated. These varieties have recently been introduced into Czechoslovakia from the USSR. Mention is made of a new blast-resistant variety, Szegedínska Osinatá [Awne Szeged], which has been selected from Arpa Shali at Szeged, Hungary.

- 3017 HASHIOKA, Y.  
**Annual and local variation of the varietal resistance of rice to the blast disease.**

Nungyeh Yenchiu/Agric. Res., Taipei 1952 : 3 : No. 3 : 40-55.

An analysis of data from experiments carried out on several varieties during the period 1934-38 in seven localities in Taiwan shows that variations in reaction to blast as the result of seasonal influences and locality were not marked.

- 3018 KATO, M. & KOYAMA, T.  
**(Ecological studies on the rice leaf miner. V. The relation between the egg laying and growth of the rice leaf miner and the variety of rice).**

Noji Shikenjo Iho/J. nat. agric. Exp. Sta. 1948 : 4 : 51-54. [Japanese].

A collection of 14 rice varieties is divided into

5 classes on the basis of the frequency of egg laying by *Agromyza oryzella* and the degree of survival of the larvae.

- 3019 WANG, M.-K.  
**(A report on a three years' regional trial of improved national rice varieties).**

Nungyeh Yenchiu/Agric. Res., Taipei 1952 : 3 : No. 4 : 67-77. [Chinese].

Yield trials of 26 varieties at the Chia-i Experimental Station, Taiwan, during 1949-51 are reported. The best variety for the first crop was Sheng-li-hsien [Victory nonglutinous rice]; for the second crop, Hsi-li-ku, Tsao-ho 4, Mao-tzu-tou and I-liang-ta-pai-ku were superior. Varieties suitable for either crop are also indicated.

- 3020 JOHNSTON, T. H. & CRALLEY, E. M.  
**Rice varietal tests, 1948-1953.**  
Mimeogr. Ser. Ark. agric. Exp. Sta. 1954 : No. 22 : Pp. 3.

The results of trials of 11 commercial varieties and 4 experimental strains carried out at different centres in Arkansas during the period 1948-53 are summarized.

## FORAGE GRASSES

- 3021 Station de Recherches pour l'Amélioration des Plantes, à Lemberge. **(Research Station for Plant Breeding, Lemberge).**

Rev. Agric., Brux. 1953 : 6 : 1810-17.

An account of current projects in the breeding of forage plants at the above station in Belgium is given. Attempts are being made to develop varieties of perennial ryegrass resistant to frost, clover resistant to *Sclerotinia* and grazing and lucerne adapted to light soils. Tetraploid lines of perennial ryegrass and white and red clover are under observation. In trials of maize, the early-maturing Netherlands hybrids CIVI-2-6 and Goudster [Golden Star] gave the highest yields; the American variety Wisconsin 240 gave lower yields than the Netherlands hybrids but matured earlier and produced grain of a superior quality.

- 3022 NÜESCH, B.  
**Gräserzüchtung in Wales. (Grass breeding in Wales).**

Schweiz. landw. Z. 1954 : 82 : 702-07.

The work of the Welsh Plant Breeding Station at Aberystwyth is described briefly and the need for a similar grass-breeding station in Switzerland is urged.

- 3023 ZIMMERMANN, K.  
Moderne Methoden in der Gräser-  
züchtung. (**Modern methods in grass  
breeding**).  
Züchter 1954 : 24 : 33-39.

It is claimed that comparatively little attention has been paid by breeders to improving the yields of forage grasses, with the result that in many cases cultivated varieties give a yield no higher than that of the wild species from which they were derived. Breeding experiments conducted with two species of wild grass at Müncheberg, Germany, during the period 1948-53 led to marked increases in yield. The crossing of two *I*<sub>3</sub> lines resulted in an improvement of up to 30% in *Avena elatior* and of up to 40% in *Dactylis glomerata*. As negative heterosis was also observed, and as the increases obtained were transmitted to the progeny of the hybrids, it is assumed that the improvement was due to the cumulative effect of genes for increased yield and not to heterozygosis. Mass selection of phenotypically superior plants also led to increases in yields, but this method was not so successful as the crossing of inbred lines.

- 3024 Veredeling op voederwaarde. (**Breeding for fodder value**).

Versl. StudKring. PlantVeredel., Wagen-  
ingen 1953 : 533-41. (Mimeographed).

This article has already been summarised in  
Abst. 2053.

- 3025 CAMUS, A.  
*Acroceras*, *Brachiaria* et *Setaria* nouveaux  
de Madagascar. (**New species of  
Acroceras, Brachiaria and Setaria  
in Madagascar**).

Bull. Soc. bot. Fr. 1954 : 101 : 28-30.

*A. parvulum* and *B. benoistii*, discovered in the Mandrare valley, Southeast Madagascar, and the Ambila region, eastern Madagascar, respectively, are described. *S. bosseri*, found at Ifoetsy, Southeast Madagascar, resembles *S. bathiei* but has a downy rhizome, a loose inflorescence and much shorter bristles. *S. taolanensis*, discovered at S. Betsiléo, Central Madagascar, is distinguished by its short flower and flat bristles.

- 3206 WRIGHT, R. E.  
**A comparison of seed measurements  
of Merion and common Kentucky  
bluegrass.**

Proc. Ass. off. Seed Anal. N. Amer.  
1953 : 57-60.

In experiments at the Government Seed Testing Laboratory, Ottawa, Canada, it was found that

Merion bluegrass tends to have a shorter and thicker seed than Kentucky bluegrass, its parent variety. It is suggested that seed of the two varieties may be differentiated by measuring the length and thickness of random seed samples.

- 3027 **Third meeting of the working party  
on Mediterranean pasture and fodder  
development, Ankara, 24 to 30 May,  
1954.**

Co-op. Res. Proj. No. 10 : FAO UN  
Ankara/3/54 : Pp. 4. (Mimeographed).

Arrangements have been made between FAO and the Commonwealth Scientific and Industrial Research Organization of Australia for a joint project to collect ecotypes of herbage plants in North Africa. A preliminary reconnaissance of such ecotypes is also to be carried out in Cyprus and Israel. Collection will be confined mainly to *Phalaris* spp., *Dactylis glomerata* var. *hispanica* and related forms, *Lolium perenne*, *L. rigidum*, *L. multiflorum*, *Trifolium repens*, *T. subterraneum* and rhizomatous forms of *Medicago sativa*. Two of the main objectives are drought resistant ecotypes and isolation of effective strains of *Rhizobium*.

- 3028 QUINTANILLA, C. F.

Instrucciones para el cultivo de prateses  
portasemillas en el norte de España.  
(**Instructions for cultivating herbage  
plants for seed in the north of Spain**).  
Inst. Nac. Invest. Agron., Madrid 1954 :  
Pp. 39.

Preliminary tests with seed obtained from Great Britain and Holland have shown the main types of herbage grasses and legumes likely to be suited for cultivation in northern Spain and directions are given for producing seed locally, with brief descriptions of each species and its main uses.

- 3029 Förädlingen och vallväxternas fiender.  
(**Breeding and enemies of herbage  
plants**).

Lantmannen, Stockholm 1954 : 38 :  
p. 344.

At a meeting held at the Agricultural College at Ultuna, Sweden, the diseases and pests attacking various herbage grasses and clover were discussed from the plant breeder's standpoint. Advances made in the production of resistant strains are briefly mentioned, as well as difficulties arising from the occurrence of different races of fungi or from variations in the developmental rhythm of the plant when grown in different parts of the country.



3030 JULÉN, G.

Svalöfs Frode hundäxing. (**The Svalöf cocksfoot Frode**).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : p. 24.

The desirable features of this new Svalöf-bred cocksfoot, now on the Swedish market (cf. Absts. 2050 and 3031), are further demonstrated by reference to its yield, leafiness and vigorous aftergrowth in comparison with the varieties Brage, Tardus II and Gullåker.

3031 JULÉN, G.

Svalöfs original Frode hundäxing (Sv 01008). [**Svalöf Original Frode cocksfoot (Sv 01008)**].

Sverig. Utsädesfören. Tidskr. 1954 : 64 : 33-36.

Further information (cf. Absts. 2050 and 3030) is given on this new cocksfoot, bred by the application of mass and pedigree selection at appropriate stages to the progeny of a plant found at Wrangelsholm in Västergötland in 1908.

3032 REBISCHUNG, J.

Études sur la variabilité des populations naturelles françaises de *Dactylis*. (**Studies on the variability of natural populations of *Dactylis* in France**).

Ann. Inst. nat. agron., Paris 1953 : 3 : Sér. B : 311-49.

The results of studies of *Dactylis glomerata* conducted throughout France by the Central Station of Genetics and Plant Breeding of the National Institute of Agricultural Research, Paris, are presented. Considerable diversity between populations from different regions was observed and the possibility of selecting strains giving higher yields and possessing a greater degree of disease resistance is examined.

3033 WEIBULL, G.

Klongräset Weibulls Smaragd—årets nyhet på gräsmatteområdet. (**The clonal grass Weibull's Smaragd, the year's novelty in regard to grass sward**).

Weibulls Allehanda 1954 : No. 1 : 15-16.

Two new clones 103 and 104 of the variety Smaragd [Emerald] of *Agrostis stolonifera* are compared. The plants of the darkish green 103 have a fine structure, while those of the lighter green 104 are somewhat less susceptible to disease and adverse effects of winter.

3034 HARLAN, J. R., BURTON, G. W. &amp; ELDER, W. C.

**Midland Bermuda-grass. A new variety for Oklahoma pastures.**

Bull. Okla. agric. Exp. Sta. 1954 : No. B-416 : Pp. 10.

A detailed account of the performance of the

variety Midland in Oklahoma is given (cf. Abst. 2065).

3035 **New strain of Bermuda in Oklahoma is favored for less fertile soils.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 29.

A new strain, Greenfield, has been selected from Oklahoma common Bermuda grass at the Oklahoma Agricultural Experiment Station. It is expected to be more satisfactory than Midland (cf. Abst. 2065) for establishing pastures on less fertile land; on fertile soils it is inferior to Midland. It is winter-hardy, has upright growth and is adapted to all districts in Oklahoma where common Bermuda will grow.

3036 WALTERS, M. S.

**A study of pseudobivalents in meiosis of two interspecific hybrids of *Bromus*.**

Amer. J. Bot. 1954 : 41 : 160-71.

Pseudobivalents, or chromosomes held together by a matrix connexion, were observed at metaphase I in *B. trinitii* x *B. maritimus* and *B. trinitii* x *B. marginatus*. In some cases, the members of a pseudobivalent were similar in morphology and the pseudochiasma connected corresponding regions; in others, the component chromosomes differed in size and morphology, or were connected at noncorresponding regions. These pseudobivalents are discussed in relation to mitotic pseudobivalents induced in various plants by X rays and chemicals, autosyndetic pairing in interspecific hybrids of *Bromus*, chiasma formation and chromosome movement.

3037 ADAMS, M. W.

**Cross- and self-incompatibility in relation to seed-setting in *Bromus inermis*.**

Bot. Gaz. 1953 : 115 : 95-105.

One group of 14  $I_2$  and  $I_3$  plants and another group of 15 plants resulting from open pollination were each crossed in pairs in a clonally replicated diallel block and also selfed, the percentage of seed set being determined. The two groups showed significant interplant differences in self compatibility. A pronounced skewness towards self incompatibility characterized the inbred group. Plants of both groups differed significantly in percentage seed set when used as parents in the paired crosses. Highly significant differences between reciprocal crosses in seed set were obtained for plants of each group. It is suggested that both additive and nonadditive gene action influenced seed

set in the diallel crosses, additive action controlling the general level of fertility and non-additive action being responsible for cross incompatibility in specific crosses. Evidence of the occurrence of selective fertilization under conditions of open pollination was obtained.

- 3038 BEAN, J., BRIAN, P. W. & BROOKS, F. T.  
**Physiologic races of the brown rust of brome grasses.**

Ann. Bot., Lond. 1954 : 18 : 129-42.

As the result of investigations carried out for 14 years at the Botany School, Cambridge University, at least five physiological races of the group species *Puccinia dispersa* have been identified on the basis of the types of reaction shown by *Bromus* spp. representative of the genus as it occurs in Europe. The host ranges of two of the races were confined to single sections of the genus; the other three had much wider host ranges. All the races remained very stable in their infection types and host ranges.

- 3039 FORTMANN, H. R.  
**Responses of varieties of brome grass (*Bromus inermis* Leyss) to nitrogen fertilization and cutting treatments.**  
Mem. Cornell agric. Exp. Sta. 1953 : No. 322 : Pp. 67.

The behaviour of varieties representing northern and southern ecotypes of *B. inermis* in N. America was investigated during a three-year period on two soil types in the vicinity of Ithaca, NY. The experiments were carried out with the main objective of obtaining information likely to be useful in designing programmes of breeding and testing forage crops. Significant interactions of variety x N fertilizer treatment, variety x cutting system and variety x cut were obtained; these interactions resulted from differences in the magnitude of varietal response rather than from the differential response of the varieties. The ranking of the varieties was similar for different fertilizer treatments and for different cutting treatments. With all conditions averaged, the southern ecotypes were superior in yield to the northern. A significant interaction between cutting system and fertilizer treatment was detected; at one centre the interaction fertilizer treatment x year was also significant. In general, yield was negatively correlated with N percentage in the forage and positively correlated with amount of N per acre.

- 3040 JENKIN, T. J.  
**Interspecific and intergeneric hybrids in herbage grasses. IV. *Lolium rigidum* et al.**

J. Genet. 1954 : 52 : 239-51.

On the basis of morphological observations at the Welsh Plant Breeding Station, Aberystwyth, a comprehensive range of annual, normally wind-pollinated types of *Lolium* from different countries was divided into (1) representatives of *L. rigidum* Gaud. and (2) types classified for convenience as *L. rigidum* sens. ampl. (cf. PBA, Vol. IX, Abst. 924). Lots in the latter category differed considerably. Data on the fertility of intercrosses within and between these two groups were consistent with those to be expected from intraspecific breeding. Under favourable natural conditions, all the types studied could have freely interbred.

- 3041 JENKIN, T. J.  
**Interspecific and intergeneric hybrids in herbage grasses. V. *Lolium rigidum* sens. ampl. with other *Lolium* species.**

J. Genet. 1954 : 52 : 252-81.

Wind-pollinating annual *Lolium* types were intercrossed with (a) the nonannual wind-pollinating species *L. italicum* and *L. perenne* and (b) the self-pollinating annual species *L. loliaceum*, *L. remotum* and *L. temulentum*. Data on the seed set and germinability of hybrids of *L. italicum* or *L. perenne* with the group of wind-pollinating annual types designated *L. rigidum* sens. ampl. (cf. Abst. 3040) were consistent with those normally obtained from intraspecific hybridization. Seed from crosses of the two nonannual species with the group classified as *L. rigidum* Gaud. showed subnormal caryopsis development and a lower germinating capacity than that normally expected with seed from intraspecific hybridization, but progenies could be easily established, which produced fertile progenies among themselves and when crossed with the parental species. Nonannual habit was dominant over annual, but its expression varied according to the perenniality of the nonannual parent. In the  $F_2$  and later generations, segregation for both plant type and perenniality was evident; back crosses showed a marked tendency to revert to the type and habit of the corresponding parental species. A very strong barrier to interbreeding existed between the wind-pollinating annual *Lolium* types and the self-pollinating annual species; this barrier was mainly shown by poor caryopsis development and the almost complete failure of the seeds to germinate.



- 3042 JENKIN, T. J.  
**Interspecific and intergeneric hybrids in herbage grasses. VI. *Lolium italicum* A. Br. intercrossed with other *Lolium* types.**  
 J. Genet. 1954 : 52 : 282-99.

The author summarizes the results of investigations already reported on the breeding interaction of *L. italicum* with annual wind-pollinated *Lolium* types (cf. Abst. 3041) and *L. perenne*. Some new data on hybrids between *L. italicum* and *L. perenne*, supporting the earlier conclusion that the interaction between the two species is of intratype nature, are given. The results of intercrossing *L. italicum* with the self-pollinating species *L. loliaceum*, *L. remotum* and *L. temulentum* differed markedly according to the direction of the cross. With *L. italicum* as ♀ parent, seed setting ranged from an average of 25% with *L. temulentum* ♂ to 60% with *L. loliaceum*. A comparison of the results obtained by using *L. rigidum* and *L. italicum* in crosses with the self-pollinating annual species supports the view that, although *L. rigidum* and *L. italicum* readily intercross, they are constitutionally different from each other.

- 3043 JENKIN, T. J.  
**Interspecific and intergeneric hybrids in herbage grasses. VII. *Lolium perenne* L. with other *Lolium* species.**  
 J. Genet. 1954 : 52 : 300-17.

The results of intercrossing *L. perenne* with *L. rigidum* sens. ampl. (cf. Abst. 3041), *L. italicum* (cf. Abst. 3042), *L. temulentum*, *L. remotum* and *L. loliaceum* are surveyed. The results of crossing *L. perenne* with each of the three self-pollinating species were approximately parallel, although some apparently significant differences in interspecific interaction were expressed. In all cases the F<sub>1</sub> hybrids were highly but not completely female-sterile. Back-cross derivatives of hybrids between *L. perenne* and the self-pollinating species did not show any increase in fertility. Triple hybrid plants were obtained by outcrossing the F<sub>1</sub> hybrid *L. perenne* x *L. loliaceum* with the hexaploid *Festuca arundinacea*.

- 3044 JENKIN, T. J.  
**Interspecific and intergeneric hybrids in herbage grasses. VIII. *Lolium loliaceum*, *Lolium remotum* and *Lolium temulentum*, with reference to '*Lolium canadense*.'**  
 J. Genet. 1954 : 52 : 318-31.

Hybrids were obtained from the three possible

crosses among the species *L. loliaceum*, *L. remotum* and *L. temulentum*. *L. loliaceum*, however, clearly differed from the other two species in some of its breeding reactions. With either *L. remotum* or *L. temulentum* it gave reasonably good seed setting and high germination percentage, but the seedlings developed abnormally. F<sub>1</sub> seedlings from crosses between *L. temulentum* and *L. remotum* developed normally up to pollen formation; their pollen sterility is believed to be due to unfavourable gene combinations. A *Lolium* line Ba 2630 ("*L. canadense*"), which could not be definitely classified as either *L. remotum* or *L. temulentum*, gave rise to a majority of partially self-fertile plants. It is suggested that a barrier to full interfertility exists between *L. remotum* and *L. temulentum* but that the divergence of the two species has not yet proceeded far. The author concludes with a review of the breeding interactions of the self-pollinating species with the normally wind-pollinated species and types, briefly commenting upon possible courses of evolution within the genus.

- 3045 PERGANDE, H.  
 Gräserartenprüfung in Reinsaat oder Mischung? Ein Beitrag zum Sortenprüfungswesen. (Testing grass varieties in pure or mixed cultures? A contribution to the conduct of variety trials).  
 Z. Acker- u. PflBau 1954 : 97 : 423-52.

At Göttingen University, Lembkes Spätling [Lembke's Late] gave the highest yields of five varieties of perennial ryegrass tested. The order in which the varieties were placed was not affected by their being sown mixed with clover or other grasses.

- 3046 **Lahoma sweet Sudan grass to be available in 1955, says Oklahoma Experiment Station.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 27; also Seed World 1954 : 74 : No. 8 : p. 36.

The new sweet Sudan grass Lahoma, recommended for central and western Oklahoma, has proved to be more disease resistant than any other variety tested at the Agricultural Experiment Station, Stillwater, but it resembles other sweet varieties in being severely damaged in wet seasons. Lahoma matures late, is uniform in growth habit and has wide yellow-green leaves.

- 3047 BURTON, G. W., DEVANE, E. H. & TRIMBLE, J. P.

**Polycross performance in Sudan grass and its possible significance.**

Agron. J. 1954 : 46 : 223-26.

Polycross progenies between 37 inbreds with tan-coloured plants and common Sudan grass were produced at Beltsville, Md. On the average, the hybrids were earlier, grew more vigorously and produced higher yields and more aftermath than the inbreds. Hybrids with 395-1, 2291-2, 2309-4 and 81-1 as the female parent significantly outyielded the standard varieties. A breeding programme to produce hybrid seed by growing equal proportions of the parent lines in mixed populations is being adopted.

- 3048 KRISHNA RAO, P. & NARASIMHAMURTY, K.  
**The improvement of the quality of straw in Talaivirichan cholam (*Sorghum Roxburghii*) in Madras State.**

Madras agric. J. 1954 : 41 : 40-42.

Talaivirichan cholam was crossed with the juicy-stalked AS 5945 to improve the straw quality of the former. AS 7657 was the best selection. In trials it gave a higher yield of grain than Co. 3 and an equal yield of straw, which was juicy and of higher fodder value, containing double the quantity of sugars of the standard.

- 3049 **Medio bluestem suited to dry-weather seasons.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 29.

The bluestem strain Medio, originating from Medio Creek district near Beeville, Tex., has given a good performance under conditions of drought.

- 3050 BOTTAZZI, G. B.

Una nuova foraggera italiana: la *Phalaris tuberosa* L. (A new Italian forage plant: *Ph. tuberosa* L.).

Genet. agr. 1954 : 4 : 1-22.

Data for 11 clones of the species collected in Italy show the existence of significant differences in respect of yield of green matter, seed and hay, and of self fertility. Thus the yield of green matter varied from 401.24 c. per ha. to 856.34 c., the hay yield from 111.83 c. to 301.24 c. and the seed set from closed flowers from 37.47% to 83.50%.

Because of their strong growth, perennial habit and drought resistance it is thought possible to produce a valuable forage plant for arid conditions and inclined situations by selection of the best clones of this species.

- 3051 HUTTON, E. M.

**The occurrence of "genetic leaf withering" in plants of *Phalaris tuberosa* x *Phalaris minor*.**

J. Aust. Inst. agric. Sci. 1954 : 20 : 49-50.

A relatively high proportion of  $F_1$  plants from *Ph. tuberosa* x *Ph. minor* developed brown and withered leaves, apparently as the result of genetic causes. Leaf withering has also occurred in a low percentage of the allopolyploid progeny obtained by treating affected  $F_1$  individuals with colchicine. The  $F_1$  of *Ph. caerulea* x *Ph. minor* did not display any withering.

- 3052 LOVE, R. M.

**Interspecific hybridization in *Stipa*. II. Hybrids of *S. cernua*, *S. lepida*, and *S. pulchra*.**

Amer. J. Bot. 1954 : 41 : 107-10.

Meiotic and morphological observations on  $F_1$  hybrids of *S. cernua* ( $n = 35$ ) x *S. lepida* ( $n = 17$ ), *S. cernua* x *S. pulchra* ( $n = 32$ ) and *S. lepida* x *S. pulchra* have led to the conclusion that the genomic constitutions of the three species may be designated as follows: *S. lepida*, 14A + 3B; *S. pulchra*, 14A + 3B + 15C; and *S. cernua*, 14A + 21D (cf. *PBA*, Vol. XVI, Abst. 1775).

- 3053 POHL, R. W.

**The allopolyploid *Stipa latiglumis*.**

Madroño, S. Francisco 1954 : 12 : 145-50.

The Californian endemic *S. latiglumis* ( $n = 35$ ) is morphologically intermediate between *S. elmeri* ( $n = 18$ ) and *S. lemmonii* ( $n = 17$ ). It is inferred that *S. latiglumis* is an allopolyploid derivative of the other two species and probably of post-Pleistocene origin.

- 3054 DE WET, J. M. J.

**The genus *Danthonia* in grass phylogeny.**

Amer. J. Bot. 1954 : 41 : 204-11.

The results of morphological, anatomical and cytological observations on *Danthonia* spp. have led the author to assign the genus to the series Phragmitiformes instead of the Festuciformes, and to place it close to the tribe Arundineae. A basic number of  $x = 6$  has been established for *Danthonia* (cf. Abst. 3055); the number of  $x = 7$  has also been suggested for the 42-chromosome species of the genus. The taxonomic position of four other genera is also discussed: *Pentaschistis* ( $x = 7$ ), *Danthoniopsis* ( $x = 9$ ), *Tristachya* ( $x = 12$ ) and *Loudetia* ( $x = 12$ ). In morphological, anatomical and cytological characteristics *Danthonia* is intermediate between the series Festuciformes and Paniciformes. It is suggested that the basic



numbers  $x = 10$  and  $x = 9$  in the Paniciformes and the common basic number  $x = 7$  in the Festuciformes have been derived from types with the secondarily established number of  $x = 12$  in the Phragmitiformes. Evidence from the genera *Tristachya* and *Loudetia*, usually included in the tribe Arundinelleae of the Paniciformes, and from certain *Danthonia* spp., further suggests that the Paniciformes may have originated in the tribe Arundineae of the Phragmitiformes.

3055 DE WET, J. M. J.

**Nucleoli numbers in *Danthonia* polyploids.**

Cytologia, Tokyo 1953 : 18 : 229-34.

The genus *Danthonia* has been found to consist of a polyploid series, the basic number of chromosomes being  $x = 6$ . Species with  $2n$ ,  $4n$ ,  $6n$ ,  $8n$  and  $12n$  were identified. In one species, *D. raoulii*,  $2n = 42$ . The two diploids, *D. curva* and *D. disticha*, had 2 and 4 nucleoli, respectively. The tetraploids had 2 or 4 nucleoli, the hexaploids 2; the single 42-chromosome species and all the higher polyploids possessed 4 nucleoli. In *D. disticha* one pair of nucleoli is produced on a satellited chromosome pair and the other is associated with a chromosome pair showing secondary constrictions. In *D. curva*, the two nucleoli are formed on a chromosome pair with secondary constrictions; no satellited chromosomes are present. The former species therefore seems to have retained the original diploid condition. As far as number of nucleoli is concerned, the polyploids have tended to revert to the diploid condition; it is assumed that loss of nucleoli occurred as the result of mutation.

3056 CAMUS, A.

*Eragrostis* nouveaux de Madagascar.  
(New *Eragrostis* species in Madagascar).

Bull. Soc. bot. Fr. 1953 : 100 : 353-55.

Three new species of *Eragrostis* are described. *E. ambositrensis*, a short grass of perennial habit, was found south of Ambositra, Central Madagascar, at a height of 1600 m. *E. ambrensis*, discovered at a height of 1200 m. on the shores of Lake Maudit, resembles *E. sarmentosa*, but differs from the latter in that the culm does not become woody at the base and in having a short, almost naked, ligule and a longer panicle. *E. sambiranensis*, discovered in the region of Maromandia, has certain similarities with *E. fluviatilis*, but may be distinguished from the latter species by its shorter and more oval spikelets.

3057 FOURY, A.

Les *Eragrostis* au Maroc. (The *Eragrostis* species in Morocco).

Terre Maroc. 1950 : No. 247 : 1-8.

Descriptions are given of six species known in Morocco and of other exotic species whose acclimatization has been attempted by the Agricultural Research Centre, Rabat. The most promising species are enumerated.

3058 Nordan wheatgrass released to North Dakota seed growers.

What's New Crops Soils 1954 : 6 : No. 7 : p. 28.

Nordan, a large-seeded, crested wheatgrass possessing resistance to cold and drought, was developed at the US Northern Great Plains Field Station, Mandan. It produces higher yields of forage than are usually associated with the above characteristics and is notable for its vigorous seedling growth.

3059 Summit crested wheatgrass performs well in Canadian tests: taller than Fairway.

What's New Crops Soils 1954 : 6 : No. 8 : p. 27.

Summit was developed by the Canadian Experimental Farms Service from a Russian strain. In tests during 1932-52, it has outyielded Fairway, the type commonly grown in Canada, and the American strain Standard.

3060 ROGLER, G. A.

**Seed size and seedling vigor in crested wheatgrass.**

Agron. J. 1954 : 46 : 216-20.

At the Field Crops Research Branch, Mandan, ND, seedlings of Standard grew more vigorously than those of Fairway. Vigorous seedling growth appeared to be correlated with seed size.

## LEGUMINOUS FORAGE PLANTS

3061 STEHLÉ, H.

Étude botanique et agronomique des légumineuses autochtones et exotiques des genres *Canavalia*, *Clitoria* et *Crotalaria* aux Antilles Françaises. (Botanical and agronomic study of exotic and indigenous leguminous plants of the genera *Canavalia*, *Clitoria* and *Crotalaria* in the French Antilles).

Rev. Bot. appl. 1953 : 33 : 490-517.

Botanical descriptions of the main species and varieties of the above genera are provided, their cultivation and agricultural importance discussed and synonyms and vernacular names listed.

3062 VOISENAT, P.

État actuel de l'amélioration de la lucerne en France. Contrôle variétal des cultures et certification des semences. (**Present state of lucerne breeding in France. Varietal inspection of the growing crop and certification of the seed**).

Proc. int. Seed. Test. Ass. 1953 : 18 : 346-53.

Data on the morphological and agronomic characters of the chief varieties of lucerne cultivated in France are given and the present breeding programme, which is aimed at obtaining fixed types with clearly distinguishable morphological and physiological characters, is outlined. Information on the procedures followed in seed production, and in seed testing and certification is also presented.

3063 WIRÉN, G.

Några synpunkter på blålucernens användning. (**Some aspects of the utilization of blue lucerne**).

Weibulls ill. Årsb. 1954 : 49 : 26-29.

In advocating the extension of blue lucerne cultivation in Sweden, stress is laid on the value of the *flamande* type and on the possibility of still further improving the set of seed obtainable from it under Swedish conditions. In addition to the well known strains Chartainvilliers, W 268 and du Puits, mention is made of Weibull's Alfa which was also selected from the *flamande* type.

3064 STANFORD, E. H. & CLEVELAND, R. W.  
**The inheritance of two leaf abnormalities in alfalfa.**

Agron. J. 1954 : 46 : 203-06.

Genetic evidence of autotetraploidy in lucerne was obtained at the University of California from  $F_2$ ,  $F_3$  and  $F_4$  segregates of crosses between normal and mutant plants. The folded leaf and mottled leaf characters, for which the symbols *fo* and *mo* are proposed, respectively, were shown to be due to single recessive genes inherited tetrasomically. The gene responsible for the mottled leaf character showed a high rate of reverse mutation. Deficiency of recessive types was found in the progenies of both crosses and was due to abortion of the embryo.

3065 SOBOLEVA, E.

(**Supplementary pollination of lucerne—an important method of increasing seed yield**).

Hlopkovodstvo/(Cott.-growing) 1954 : No. 5 : 32-34. [Russian].

Details are given concerning the insect pollinators

tors of lucerne in Uzbekistan. The yield of seed was raised from 1 c. per ha. to over 3 c. by placing beehives in the vicinity of the fields where seed production was carried out.

3066 PETERSEN, H. L.

**Pollination and seed setting in lucerne.**

K. VetHøjsk. Årsskr. 1954 : 138-69.

Under conditions at Albertslund, near Copenhagen, Denmark, seed setting after self tripping or without tripping was found to be negligible. Self tripping generally caused self pollination but the possibility of its allowing cross pollination cannot be entirely excluded. Experiments were carried out on the species and numbers of bees active in pollination, tripping percentages, the working methods of the honey bee, speed of working of the different bees, their efficiency in pollination and the frequency of tripping in different strains of lucerne. It was calculated that honey bees may effect 57% of the trippings, *Melitta* 28% and bumble bees the remainder. Du Puits showed the highest frequency of tripping per day (11%). No differences between Du Puits and Øtofte could be detected with respect to self fertility; Du Puits, however, was apparently more self fertile than Øtofte Grimm and Øtofte Canadian. One to two seeds were produced per cross pollination; Du Puits generally exhibited a higher degree of cross fertility than the other three strains referred to. Only 60-70% of the seeds resulting from cross pollination appeared to be normal and well-developed. Microclimatic conditions influenced seed set, as shown by the effect of the raceme position.

3067 LESINŠ, K., ÅKERBERG, E. & BÖJTÖS, Z.  
**Tripping in alfalfa flowers.**

Acta agric. Scand. 1954 : 4 : 239-56.

Investigations were carried out at Ultuna, Sweden, and at Magyaróvár, Hungary, during the period 1948-51 to study (1) the amount of pod and seed setting without tripping; (2) the amount of automatic and bee tripping; (3) automatic tripping in relation to weather conditions and (4) tripping in relation to seed set. During 1952, additional observations were made at Edmonton, Canada. Pod and seed setting without tripping were in most cases negligible. In open plots from which bees were excluded, 13-65% of the flowers tripped automatically. In plots accessible to bees tripping was 4-73% higher than in bee-free plots; the tripping efficiency of honey bees apparently consisted in



accelerating automatic tripping. Weather conditions bore no direct relation to percentage of automatic tripping. Seed set from automatic tripping in bee-free plots ranged from 10 to 94% of that obtained in plots visited by bees. At Ultuna, automatic tripping was considerably more frequent than at Magyaróvár and relatively fewer seeds developed per insect-tripped or automatically tripped flower. The better seed set at Magyaróvár was probably due to a higher population of pollinating wild bees and more favourable environmental conditions. For the improvement of seed production in Sweden, it is suggested that varieties morphologically better adapted to honey-bee pollination or with an inherent capacity to give satisfactory seed yields in spite of automatic tripping and other unfavourable conditions could be bred; the behaviour of *Ferax* suggests that the latter course is possible.

3068 PEDERSEN, M. W.

**Seed production in alfalfa as related to nectar production and honeybee visitation.**

Bot. Gaz. 1953 : 115 : 129-38.

Nectar secretion in relation to honey bee visitation and seed production of lucerne was studied at Logan, Utah, during 1946-51. Positive correlations of nectar production per plant with honey bee visitation and seed production were detected. Seed production and bee visitation were significantly correlated, whether the pollinators were restricted to nectar collectors or whether natural bee-visitations was allowed. Seed production ranged from 8.8 to 44.8 g. per plant, with an average of 17.2 g.; the possibility of improving this character by breeding is therefore indicated. Nectar production of polycross progenies was positively correlated with that of their maternal parents. Data on selfs and crosses suggested that nectar production was inherited on a multifactorial basis.

3069 JONES, L. G., ZSCHEILE, F. P. & GRIFFITH, R. B.

**Carotene and protein contents of alfalfa as influenced by variety and certain environmental factors.**

Hilgardia 1953 : 22 : 179-202.

Information is provided on the sampling methods and drying conditions found to be the most efficient in determining the carotene and protein contents of lucerne varieties. In a one-year comparison of many varieties, no single variety proved to be consistently higher than the others in either carotene or protein content.

The data indicated the necessity of sampling at the same stage of maturity in making varietal comparisons.

3070 SACHS, E.

**Die "Altfränkische Luzerne Frankenswarte" als Beispiel einer guten Landsorte. (The Old Franconian lucerne "Guardian of the Franks" as an example of a good land race).**

Saatgutwirtschaft 1954 : 6 : 64-67.

The term land race is defined and a brief account of the above variety given. In trials at Weihestephana, Bavaria, Old Franconian land races have proved superior in yield and protein content to all lucerne varieties introduced from the USA and to nearly all German varieties.

3071 Årsmelding om Felleskjøpets virksomhet i 1953. (Annual report on the work of the Cooperative Society in 1953).

Samvirke 1954 : 49 : 223-36; 261-66.

In trials of Canadian Grimm lucerne and the French strain Du Puits under Norwegian conditions, the latter strain did not equal its performances in southern Sweden and Denmark. Yield trials of the hybrid maize Wisconsin 240 were also conducted.

3072 ANDREW, W. D. & HUDSON, W. J.  
**Barrel medic 173 (*Medicago tribuloides* Desr.).**

Agric. Gaz. NSW 1954 : 65 : Pt. 2 : 76-80.

This strain has shown superiority over other types of *Medicago* grown in New South Wales, Victoria and South Australia. It is an annual, suitable for districts where the growing season is short. In appearance it is similar to other strains of *M. tribuloides* but can be distinguished by the purple-brown marks on its leaves.

3073 WILLIAMS, W.

**An emasculation technique for certain species of *Trifolium*.**

Agron. J. 1954 : 46 : 182-84.

Details of a technique found satisfactory for emasculating *T. repens*, *T. pratense* and *T. hybridum* are given. The entire corolla, together with the staminal tube and anthers, is withdrawn by forceps from the calyx of flowers at a suitable stage, leaving the pistil intact. In the case of *T. pratense*, the corolla and calyx had to be slit longitudinally on the under side before this operation, otherwise the carpel was removed. The emasculated flowers should be immediately sprayed with water as an additional safeguard against fertilization by any pollen already deposited on the stigma.

**3074 Dollard clover is increased for release in Minnesota.**

What's New Crops Soils 1954 : 6 : No. 7 : p. 28.

This new red clover variety, which was developed in Canada, has been recommended by the University of Minnesota. During a testing period of nine years it has produced more seed and has lasted longer than other varieties. It is moderately resistant to anthracnose and black stem.

**3075 NUTMAN, P. S.**

**Symbiotic effectiveness in nodulated red clover. 1. Variation in host and in bacteria.**

Heredity 1954 : 8 : 35-46.

In the case of effective or partially effective strains of bacteria, the response of individual plants of an unselected red clover variety, expressed in terms of amount of growth made on a N-free medium, showed a positively skew distribution. With such strains, the distribution curves of host response exhibited in general a primary mode of effectively responding plants and a secondary mode of ineffectively responding plants. The relative sizes but not usually the positions of these modes varied with the bacterial strain. In the case of ineffective strains of bacteria, the distribution curve for host response was negatively skew and displayed only a single mode. Preliminary breeding experiments indicated that host-plant differences in response were heritable.

**3076 NUTMAN, P. S.**

**Symbiotic effectiveness in nodulated red clover. 2. A major gene for ineffectiveness in the host.**

Heredity 1954 : 8 : 47-60.

The completely ineffective response of a family derived from late-flowering Montgomeryshire red clover, when inoculated with the normally effective strain A of *Rhizobium trifolii*, is ascribed to homozygosity for a simple recessive  $i_1$ . Plants with the constitution  $i_1i_1$  exhibited an effective response to other effective strains unrelated to A. Two kinds of variant substrains of A were discovered: one type restored host response to complete effectiveness; the other was associated with the restoration of the effective response in only a proportion of the homozygous recessive plants, suggesting the action of host modifiers. Host modifiers also apparently influenced the interaction with the first type of bacterial variant, as shown by outcross data. A recessive suppressor,  $m_1$ , restoring  $i_1i_1$  plants to a completely effective response to strain A was also detected.

**3077 WEXELSEN, H.**

Frøavl av rødkløver. Vil den erobre en ny plass som vekst mellom kornårene? (Seed raising of red clover. Will it acquire a new position as a crop between cereal years).

Samvirke 1954 : 49 : 346-49.

Methods and results of clover seed production in Norway, Sweden and Denmark are compared (cf. Abst. 2103), with suggestions for establishing red clover seed production on a sound basis in suitable parts of Norway. Research on the role of bees in pollination and seed setting should be coordinated with seed production, as has been done in Denmark and Sweden. Plant breeders could increase seed yields by breeding (1) strains with shorter corolla tubes to facilitate the work of the bees, and (2) productive strains.

**3078 Varför importerar vi vallväxtfrö? (Why do we import seed of herbage plants?)**

Tidskr. Lantm., Helsinki 1954 : 36 : 66-67.

Finland possesses acclimatized strains of late types of red clover that are unobtainable from other countries. Their lateness provides the opportunity for pollination by more than one generation of bumble bees, thus ensuring a more reliable set of seed.

As seed production in Finnish cocksfoot, meadow fescue and ryegrass is low, in spite of the good quality and fast growth of the local strains, seed requirements might be met by taking seed from more fertile imported strains from Denmark.

**3079 YAMADA, Y.**

**(Studies on the occurrence and mechanism of nongenetic variation due to competition. III. Augmentation of variation within assemblages of red clover individuals due to competition).**

Ikushugaku Zasshi/Jap. J. Breeding 1953 : 3 : 17-22. [Japanese].

The growth of a Japanese strain was compared when sown either sparsely or densely, and when raised on untreated soil, soil to which a nitrogenous fertilizer had been added or soil to which bacterial inoculum had been added. A parallel series of pot experiments was also made. It was observed that plant height was little affected by either of the treatments or by density of sowing. Top weight, however, while little affected by the treatments, was greater in sparse sowings, though the coefficient of variation for this character was greater in the dense sowings. The pot experiments showed that the population was highly heterogeneous



morphologically and differed also in respect of germination rate. It is inferred that these two sources of variation contribute to the increased coefficient of variation resulting from more intense competition.

3080 OWEN, C. R.

**Louisiana S1 white clover.**

Bull. La agric. Exp. Sta. 1953 : No. 479 : Pp. 15.

The development and subsequent testing of the synthetic variety Louisiana S1 are described (cf. *PBA*, Vol. XXII, Abst. 1223); an account of methods of producing foundation and certified seed is also provided.

3081 ATWOOD, S. S. & BREWBAKER, J. L.

**Incompatibility in autopoloid white clover.**

Mem. Cornell Univ. agric. Exp. Sta. 1953 : No. 319 : Pp. 47.

A detailed report of investigations on the genetics of incompatibility in colchicine-induced 64-chromosome white clover is presented (cf. *PBA*, Vol. XXI, Abst. 1921).

3082 DADAY, H.

**Gene frequencies in wild populations of *Trifolium repens*. 1. Distribution by latitude.**

Heredity 1954 : 8 : 61-78.

The structure of wild populations of *T. repens* was analysed with respect to cyanogenetic glucosides and the enzyme linamarase, whose production is determined by two independent genes, *Ac* and *Li*, respectively (cf. *PBA*, Vol. XV, Abst. 819). Using a modified picric acid test, four phenotypes were distinguished, *AcLi*, *Acli*, *acLi* and *acli*. The genotypic structure was determined for each of the gene pairs *Acac* and *Lili* by means of the Hardy-Weinberg formula ( $p^2 + 2pq + q^2 = 1$ ). The frequencies of both *Ac* and *Li* showed a continuous and gradual decrease from the high values in samples from the Mediterranean region to the low values of samples from north eastern Europe. The distribution of the frequencies of the dominant alleles was closely correlated with the January isotherms. The role of geographical factors in conditioning gene-frequency clines for various characters in wild populations of *T. repens* is discussed.

3083 TIVER, N. S.

**Strawberry clover.**

J. Dep. Agric. S. Aust. 1954 : 57 : 317-25.

This general account includes information on the behaviour of strains grown in observation plots in S. Australia.

3084 **Pasture investigation.**

Commonw. Agric. 1954 : 24 : 31-32.

Subterranean clover lines that produce a high

proportion of hard seed and are suitable for cultivation in the coastal regions of northern New South Wales have been selected from the cross Dwalganup x Northam First Early. From crosses of Tallarook with Dwalganup and Northam First Early, strains producing earlier growth and setting seed earlier in the season than Tallarook have been obtained.

Cross pollination has resulted in lines of white clover resistant to drought and other adverse conditions.

3085 HUTTON, E. M. & PEAK, J. W.

**Studies of intervarietal hybridization in subterranean clover (*Trifolium subterraneum* L.).**

Aust. J. agric. Res. 1954 : 5 : 271-78.

Pollen of subterranean clover germinated freely on agar medium at relative humidities above 95% and at temperatures between 20 and 25°C, relative humidity being the more critical factor. On the basis of these findings an improved technique of artificial hybridization was devised. Using this method, a mean seed set of 35.3% was obtained from 18 intervarietal crosses. Varying degrees of compatibility existed between the different crosses. In a number of  $F_1$  hybrids, one or more parental characters were dominant. The grey-green leaf colour of Northam First Early, Dwalganup and Pink Flowered was a well-defined dominant character; the deep pink colour of the flowers of the last-named variety appeared to be recessive.

3086 HARRIS, J. R.

**Rhizosphere relationships of subterranean clover. I. Interactions between strains of *Rhizobium trifolii*.**

Aust. J. agric. Res. 1954 : 5 : 247-70.

When subterranean clover was inoculated with more than one strain of *Rh. trifolii*, competition between strains occurred; this competition was reflected in nodule pattern and plant reaction. The concept of incursion as a property of a rhizobial strain is suggested, an incursive strain being able to migrate from the initial site of inoculation and ultimately establish an adequate population in the susceptible host in spite of opposition from other organisms. For purposes of commercial inoculation, a strain of *Rhizobium* should satisfy the three-fold requirement of being virulent, incursive and effective.

3087 WALLER, E.

Svalöfs Stjärnvicker (Vg 02051). [The Svalöf Star vetch (Vg 02051)].

Sverig. Utsädesfören. Tidskr. 1954 : 64 : 26-32.

Bred by the author at the Västergötland Branch

Station of the Swedish Seed Association, this new, very early vetch, obtained by selection from a land variety from Remmenedal in Älvsborg is now on the market. Its seeds are only about half the size of those of Svalöfs Förädlade Sötvicker [Svalöf Improved Sweet vetch], which means a saving in seed costs. It is particularly recommended for growing in a pure stand or mixed with the white oat varieties in general use; it is less suitable for green fodder mixtures, as its yield of green forage is relatively low.

The seeds are dark grey with dark mottling. The leaves are light green and the flowers darker purple than those of Svalöfs Förädlade Sötvicker, while the tendrils are strongly developed.

Details of its performance in comparative yield trials, when grown in pure stands or in mixtures, are tabulated.

- 3088 WALLER, E.  
Svalöfs Stjärnvicker (Vg 02051). [The Svalöf Star vetch (Vg 02051)].  
Allmänna Svenska Utsädesaktiebolaget,  
Svalöf 1954 : 21-23.

See Abst. 3087.

- 3089 **Seed-producing aftermath is less of problem in new yellow-blossom sweetclover.**

What's New Crops Soils 1954 : 6 : No. 8 : p. 31.

Erector, a yellow variety of sweet clover, has been produced at the Brandon Experimental Station, Man. Its stems are erect and the lower branches grow from the main stem at an acute angle; in cutting for hay most of the flowers are therefore removed, leaving a stubble for seed production if desired. In tests at Brandon, Erector has given higher yields of hay than other varieties of sweet clover in five out of eight years.

- 3090 GREENSHIELDS, J. E. R.  
**Embryology of interspecific crosses in *Melilotus*.**  
Canad. J. Bot. 1954 : 32 : 447-65.

Investigations on the embryology of crosses involving the following 12 species are reported: *M. alba*, *M. officinalis*, *M. suaveolens*, *M. polonica*, *M. dentata*, *M. altissima*, *M. hirsuta*, *M. taurica*, *M. messanensis*, *M. italica*, *M. sulcata* and *M. speciosa*. Viable seed was readily obtained from reciprocal crosses between *M. alba* and *M. suaveolens*; although developing

ovules of *M. alba* ♀ x *M. suaveolens* ♂ were smaller than those of the reciprocal, the embryo was much larger and more differentiated and the endosperm more abundant. Among the partially compatible crosses, *M. officinalis* ♀ x *M. alba* ♂ produced the most advanced embryo, growth proceeding normally for about 18 days and more slowly for a further period of 6 or 7 days; embryos from the reciprocal aborted earlier. In some other partially compatible combinations, e.g. *M. officinalis* x *M. suaveolens* and *M. alba* x *M. messanensis*, normal proembryos were formed but after approximately the 6-day stage the proembryo lost polarity, ovule abortion occurring some 6 days later. Embryos of *M. alba* ♀ x *M. dentata* ♂ sometimes aborted, in spite of an apparently well-developed endosperm. Reciprocal crosses of *M. suaveolens* x *M. altissima* and *M. altissima* x *M. polonica* produced essentially normal embryos up to 8 days. Among the crosses showing a low degree of incompatibility, expressed in various ways, were *M. officinalis* x *M. dentata*, *M. altissima* x *M. alba*, *M. altissima* x *M. dentata*, *M. italica* x *M. altissima*, *M. officinalis* x *M. altissima*, *M. alba* x *M. sulcata* and *M. italica* x *M. officinalis*. Attention is drawn to the possible practical value of interspecific hybridization in combination with embryo-culture techniques.

- 3091 **Incubator sweetclover hybrids.**

Agric. Res., Wash. 1954 : 2 : No. 11 : 8-9.

The development at the Wisconsin Agricultural Experiment Station of a white sweet clover with low coumarin content from the cross *Melilotus dentata* x *M. alba* is briefly described. Hybrids of a cross between this new type and *M. officinalis* have been obtained at the Nebraska Experiment Station by excising the hybrid embryos from the ovules and growing them on a special nutrient solution. F<sub>2</sub> and backcross progeny have also been produced.

- 3092 KATAYAMA, Y. & NAGATOMO, T.  
**(Coloration of the young plant and alkaloid reaction in the yellow lupin).**  
Ikushugaku Zasshi/Jap. J. Breeding  
1953 : 3 : 43-44. [Japanese].

Analysis of the F<sub>1</sub>-F<sub>3</sub> generations of crosses between a bitter lupin in which the young plants had purple pigmentation and a sweet lupin without juvenile pigmentation showed that alkaloid content and juvenile pigmentation were independently inherited characters. Sweet pigmented and bitter unpigmented lines were isolated.



**3093 Louvana.**

Rur. Res. CSIRO 1954 : No. 7 : 4-5.

Louvana, a strain of *Lathyrus ochrus* introduced into Australia from Israel, has given higher yields than tick beans and other green manure crops on the light soils of the Murray Valley irrigation areas. The crop is immune from pea weevil and fairly tolerant of the red-legged earth mite. High nitrogen content and seed production are additional advantages.

**ROOTS AND TUBERS****3094 OPSAHL, B.**

Valg av rotvekststammer. (**The choice of strains of root crops**).

Samvirke 1954 : 49 : 141-42.

Descriptions are given of Scandinavian strains of swedes, turnips, mangels and sugar mangels recommended for cultivation in Sør-Østland in Norway. The particulars refer to yield, quality, disease resistance, and suitability for ensilage and machine harvesting as recorded in Norwegian trials. The Danish sugar mangel Rød Øtofte [Red Øtofte] is mentioned for its high dry matter percentage.

**3095 SEDLMAYR, K.**(**Phasic development in beets**).

Acta agron. 1953 : 3 : 385-421. [Russian].

Lysenko's dicta on the phasic development of plants are reviewed and the results of experiments conducted at the Sopronhorpács Experimental Farm, Hungary, on the effect of light and temperature on the vegetative and generative development of *Beta* are presented, special emphasis being laid on the problem of bolting.

**3096 SEDLMAYR, K.**

[**Miçurinite methods of creating new varieties and our own latest results.**

**I. Beet (*B. vulgaris* L.)].**

Acta agron. 1952 : 2 : 107-23.

[Russian].

An account of sugar and forage beet breeding along Miçurinite lines at the Sopronhorpács Experiment Station is given. *Beta trigyna* x *B. vulgaris* hybrids have shown considerable vigour and given high yields.

**3097 WELLENSIEK, S. J. & VERKERK, K.****Annual seed growing of beets.**

Netherlands J. agric. Sci. 1954 : 2 :

98-104.

The bolting of biennial mangels, sugar beets and garden beets was found to be dependent upon temperature and length of day in experiments at the horticultural plant breeding

station, Wageningen, Netherlands. Vernalization of the seed at temperatures slightly above 0° C and cultivation of the young plants in cold frames at 1° C under continuous artificial light induced bolting when the plants were later transferred to the field; seed was obtained in the same year as the plants were sown.

**3098 NÖTZEL, H.**

Die wesentlichsten Gesichtspunkte für die Sortenwahl bei Futterrüben. (**The most essential points of view for the selection of mangel varieties**).

Dtsch. Landw., Berl. 1954 : 5 : 193-96.

The comparative merits of high root yield and high dry matter content are discussed and it is concluded that the latter is a more important factor than the former in the feeding of live-stock. Of the eleven principal varieties cultivated in Eastern Germany, Altenburger Tonnen [Altenburg Weighty] and Criewener Gelbe [Criewen Yellow] give the highest yields of roots per hectare, Dickwanst and Altenburger Tonnen produce the best yields of dry matter, whilst Teutonia has the highest dry matter content and produces the greatest weight of foliage per given area.

**3099 Forsøg med stammer af foderbeder.**

Runkelroe, fodersukkerroe og sukkerroe

1950-53. (**Strain trials of forage beets.****Mangel, sugar mangel and sugar beet, 1950-53).**

Tidsskr. Frøavl. 1954 : 21 : 294-97.

The nine successful varieties certified as first class in three trials are enumerated in a table showing (a) their yields per ha. of roots and tops and of dry matter in the roots and tops and also in the roots + 60% of tops; and (b) the percentage dry matter in the roots and in the tops.

The Barres mangel, Øtofte Nova XI, gave the highest yield of roots per ha. and showed the highest dry matter content both for root and tops. The highest yielding sugar mangels were Gul Dæno XI [Yellow Daeno XI] and Hvid Øtofte XI [White Øtofte XI], while the two best sugar beets for fodder use were Hinderupgaard XI and Hunsballe XI.

**3100 MITSUKURI, Y.**

(**Chromosome studies on *Brassica* in our country. I. Chromosome numbers and caryotypes of 5 species**).

Senshokutai (Chromosome)/Kromosomo 1953 : No. 16 : 575-79. [Japanese].

The following caryotypes are reported: *B. rapa*,  $2n = 20 = 4A^{sm} + 8B^{m} + 8C^{t}$ ; *B. oleracea*,  $2n = 18 = 2A^{sm} + 4B^{st} + 2C^{m} + 8D^{m} +$

2E<sup>m</sup>; *B. cernua*, 2n = 36 = 2A<sup>st</sup> + 10B<sup>st</sup> + 8C<sup>m</sup> + 2D<sup>st</sup> + 12E<sup>t</sup> + 2F<sup>t</sup>; *B. campestris* var. *nippo-oleifera*, 2n = 38 = 4A<sup>sm</sup> + 6B<sup>m</sup> + 10C<sup>sm</sup> + 4D<sup>m</sup> + 8E<sup>t</sup> + 6F<sup>t</sup>; and *B. juncea*, 2n = 36 = 2A<sup>sm</sup> + 2B<sup>m</sup> + 2C<sup>m</sup> + 4D<sup>sm</sup> + 4E<sup>sm</sup> + 6F<sup>m</sup> + 10G<sup>t</sup> + 6H<sup>t</sup>.

3101 SHIBUTANI, S. & OKAMURA, T.

(The classification of Japanese turnip varieties in the light of the type of epidermis in the seed).

J. hort. Ass. Japan 1954 : 22 : 235-38.

A series of Japanese and American varieties are classified into three taxonomic groups. In group A, the western European forms, the epidermal cells of the testa do not swell in water, the leaves are hairy and bolting is late. In the intermediate group B, the epidermal cells of the testa are as in group A, but the leaves are glabrous and bolting is not quite so late. Group C, which includes most of the Japanese varieties, comprises forms in which the epidermal cells of the testa swell on absorbing water; the leaves are glabrous and bolting is comparatively early.

3102 Stoppelknollen, 1954. (Turnips, 1954). Landbouwwoorlichting 11 : Bijl. 16; Ber. Rassenkeuze No. 168 : 1954 : unpaginated.

This brief account of the chief varieties cultivated in the Netherlands includes tabulated data on content and yield of dry matter, degree of resistance to frost and club root, suitability for mechanical harvesting and extent to which the foliage remains green.

3103 Rotfrukterna en odling som bör ökas. (Roots, a crop that should be increased).

Weibulls ill. Årsb. 1954 : 49 : 19-25.

In this composite article on the place of root crops in Swedish farming and their value in the livestock ration, Y. Hörberg contributes a paper on the kind and variety of root crop to choose for cultivation under various conditions. The green-topped Wilhelmsburg swede is mentioned as being more resistant to club root than the Bangholm strains and keeps better in storage than other strains. The turnips Tellus and Pedigree Bortfeld, though high yielding, should be replaced by Weibull's oval variety, Immuna III strain 53, on club-root infected soil, as it is even more resistant than Immuna II.

3104 EIKELAND, H. J.

Stammeforsøk med nepe i åra 1947-52. (Strain trials with turnips in 1947-52).

Bondevennen 1954 : 57 : 145-48.

The results of comparative trials of turnips at

the Forus Research Station and various outlying experimental plots in Vestland and Sørland are discussed, with reference to varietal characteristics, such as disease resistance, yield and content of dry matter and weight of roots produced. Bortfelder, Weibull's Tellus, Yellow Tankard, Vidarshov I, or Roskilde IX are recommended for soils where club root infection is absent, while, on more infected soil, Weibull's Immuna II, Kvit mai [White May] or Roskilde B are to be preferred.

3105 SURPRENANT, V.

Amélioration de la pomme de terre II. Sélection et certification. (Potato breeding II. Selection and certification).

Rev. Oka 1954 : 28 : 33-39.

A general account of breeding techniques and of the cultivation of potatoes for seed purposes is given, together with details of the standard required by the Canadian Ministry of Agriculture for certification purposes.

3106 PETERSON, C. E., ELLIS, N. K., AKELEY, R. V. & STEVENSON, F. J.

Cherokee: a new medium-maturing potato variety resistant to common scab, late blight, mild mosaic, and net necrosis.

Amer. Potato J. 1954 : 31 : 53-58.

The variety Cherokee is described (cf. PBA, Vol. XXI, Abst. 2775). In trials in Iowa, Maine and Minnesota, it has consistently outyielded Irish Cobbler.

3107 New potato introduced for use in Minnesota.

What's New Crops Soils 1954 : 6 : No. 7 : p. 28.

Osseo, a white, early maturing variety suitable for home and market-garden growing, has been introduced by the University of Minnesota. Its tubers are of a good size and shape.

3108 SELSJORD, I.

Forsøk med tidlege potetsortar. (Experiments with early potatoes).

Forskn. Fors. Landbr. 1953 : 4 : 439-56.

A detailed account is given of the yields and tuber size of the following varieties when lifted at various dates in trials during 1945-52 at the Forus Experiment Station and in outlying districts in Norway: Epicure, Doon Early, Irish Cobbler, British Queen, 140/40 (Kerr's Pink x Venus), Saga and Green Mountain. The medium early 140/40 equalled British Queen on the average for all fields at the third lifting and had larger tubers at all liftings.



3109 IVANČENKO, E. A.

(**Role of grafting in hybridization of *Solanum demissum* with cultivated varieties**).

Agrobiologija (Agrobiology) 1954 : No. 2 : 140-43. [Russian].

Compatibility between cultivated varieties and *S. demissum* was improved when the wild species was grafted on to a cultivated potato or on to tomato or *Datura tatula*. From these crosses many forms resistant to *Phytophthora* were selected, some resembling the cultivated parent. A description of the hybrids 1870s/50 and 1880s/50, from

Moskovskii [Moscow]

Oktjabrenok [Little Oktobrist] <sup>x</sup>  
*S. demissum*  
 Oktjabrenok <sup>x</sup> K1711,

is given; they give higher yields and possess a higher content of starch than the standards in the Moscow province and are resistant to late blight. The hybrid 1880s/50 has proved resistant to wart.

3110 WEBB, R. E. & MILLER, J. C.

**Red LaSoda—a mutation of La Soda.**

Amer. Potato J. 1954 : 31 : 40-43.

The potato variety Red LaSoda was produced in Louisiana from half a tuber of LaSoda which was a more intense red than the normal tubers. It is similar to LaSoda in plant and tuber characteristics and gives an equal yield. The quality is as good as most varieties grown in the southern states.

3111 KRESS, H.

Sortenwertlinien und Anbauzonen. (I. Teil: Kartoffelsorten). [**Varietal evaluation curves and zones of cultivation. (Part I: Potato varieties)**].

Dtsch. Landw., Berl. 1954 : 5 : 182-87.

The relationship between variety and environment was studied at seven centres in Eastern Germany during the period 1949-53. In mountainous regions with an inclement climate, Ackersegen and Merkur gave the highest yields, while Capella and Nova proved superior to other varieties in maritime and low-lying areas. Aquila gave good yields in all districts.

3112 KOPETZ, L. M. & STEINECK, O.

Photoperiodische Untersuchungen an Kartoffelsämlingen. (**Photoperiodic investigations on potato seedlings**).

Züchter 1954 : 24 : 69-77.

Seedlings of the variety Sieglinde and seedlings from the crosses Sieglinde x Flava and Bintje x Flava were classified according to their reaction to varying photoperiods at the Institute for

Horticulture and Plant Breeding, Vienna. Plants with pronounced long or short-day response gave satisfactory yields only when a certain critical maximum or minimum photoperiod had been reached and maintained for a considerable number of days; neutral plants, on the other hand, yielded well under all conditions, although short photoperiods resulted in a slight diminution in yield and in changes in the morphology of the leaves and tuber. Plants requiring short-day conditions to attain maximum tuber development may be distinguished under long-day conditions by their excessive vegetative growth and it is suggested that, as the short-day character is inherited, breeders should aim at eliminating such types in the young plant stage as they are unsatisfactory for cultivation under European conditions.

3113 SCHULZE, W.

Die Keimstimmung der Kartoffel und ihre Bedeutung für die Züchtung und Pflanzguterzeugung. (**Conditioning germination in the potato and its importance for breeding and seed production**).

SchrReihe ForschAnst. Landw. Braunschweig-Völkenrode 1951 : No. 3 : Pp. 183.

This short symposium presents a survey of previous research on dormancy in the potato and gives an account of recent experiments at Völkenrode, Brunswick, Germany.

Schulze, W. & Fischnich, O. Über Keimförderung und stoffliche Veränderungen in der Kartoffelknolle bei Beginn und im Verlauf der Keimung. (On promoting germination in the potato tuber and the chemical changes at the beginning of and during germination). (pp. 5-113).

Physiological factors determining the duration of the rest period are discussed, means of interrupting it by mechanical and chemical treatment are indicated and the practical value to the breeder of being able to plant two or three generations in a single year is stressed. Tabulated data show the differences in duration of dormancy between the varieties of the official German collection at varying temperatures and at different stages of maturity of the tuber. In addition, varietal differences in the length of the rest period caused by varying periods of exposure to light were observed. Interruption of the rest period was found to lead to an increase in sugar content and a corresponding decrease in starch content.

Fischnich, O. & Wollner, F. *Über den Einfluss keimhemmender Substanzen auf Pflanzkartoffeln. (On the influence of inhibitory substances on the germination of seed potatoes).* (pp. 115-65).

Results obtained by the use of chemical compounds in inhibiting germination in stored potatoes are described and varietal differences in reaction noted.

Fischnich, O. & Gorsler, A. *Lagerung von Kartoffelpflanzgut bei künstlicher Beleuchtung. (Storing seed potatoes in artificial light).* (pp. 167-83).

Constant exposure to red light was found to delay germination in *Primula* and *Frühbote* [Early Messenger].

3114 DROZD, J.

Wpływ długości dnia na rozwój czterech odmian ziemniaków. (The effect of the length of day on the development of four potato varieties).

Roczn. Nauk rol. 1952 : 64 : 83-94.

Three varieties of German provenance and the Polish grown *Kazimierskie 55* from the cross Early Rose x *Katahdin* were subjected to a day length not exceeding 10 hours. *Kazimierskie 55* was the only variety which produced buds and an increased tuber yield; only in its case also was the decreased mass of leaf accompanied by an increase in tuber yield. It is concluded that this variety might be adapted as regards its reaction to a shortened day, thereby raising its export value for southern countries.

3115 PUSHKARNATH

Studies on sterility in potatoes. V. Genetics of self- and cross-incompatibility in *Solanum rybinii*.

Indian J. Genet. 1953 : 13 : 83-90.

Under normal conditions in the field the following members of the series *Tuberosa* were self incompatible: *S. aracc-papa*, *S. simplicifolium*, *S. stenotomum*, *S. berthaultii*, *S. anomalocalyx*, *S. yabari*, *S. lapazense* and *S. rybinii*. Under conditions of low temperature (54-56° F), certain genotypes of *S. rybinii* exhibited some self compatibility. Crosses of *S. rybinii* with five diploid species of the series *Commersoniana* were compatible in either direction. F<sub>1</sub> plants from *S. rybinii* x *S. subtilius* were largely cross incompatible in crosses among themselves, and entirely cross incompatible in back crosses with the parents. It is suggested that the S genes whose multiple alleles determine the incompatibility systems in the series *Tuberosa* and *Commersoniana* are at two different loci.

3116 Poteter med lite ris? (Potatoes with little haulm?)

Norsk Landbr. 1954 : 20 : p. 257.

Citing a case in which the excessive haulm length rendered any effective spraying of potatoes on a Norwegian farm impossible, the writer suggests that plant breeders should take advantage of existing varietal differences in haulm production to breed a good quality variety in which the amount of haulm is reduced.

3117 Neue Kartoffelsorten 1953/54. (New potato varieties 1953-54).

Kartoffelbau 1954 : 5 : p. 136.

Data on three new varieties recently accorded official recognition in Western Germany are tabulated. Pavo is a late early variety giving a high yield of good quality tubers with yellow flesh and a fairly high starch content. Aronia is a high yielding variety intended primarily for fodder purposes. Sirtema, an introduction from the Netherlands, matures very early and gives a good yield of medium-quality tubers with light yellow flesh and a low starch content.

3118 Sheridan, Dazoc potatoes now available in Nebraska.

What's New Crops Soils 1954 : 6 : No. 6 : p. 26.

The new varieties, Sheridan and Dazoc, released by the Nebraska Agricultural Experiment Station, are early maturing and produce smooth, round, bright red tubers of good market and cooking quality. Sheridan is suitable for the western and Dazoc for the western and central irrigated areas of Nebraska.

3119 BAMBERGS, K.

Ābolu un kartupeļu cietums un ķīmiskais sastāvs. (The consistency and chemical structure of apples and potatoes).

Latv. PSR Zināt. Akad. Vestis 1952 : 55 : No. 2 : 83-90.

A method of assessing the keeping properties of fruits and vegetables, based on an analysis of the consistency of their flesh and skin, is described. Borsdorf Kitaika [Borsdorf Chinese Crab] and Vidzemes Sīpoliņš [Vidzemes Onion] had the hardest flesh and skin of the apple varieties tested. Agrie Rožu [Early Rose] and Priekuļu Agrie [Early Priekuli] were the potatoes with the firmest tubers.

3120 Les variétés admises au contrôle 1954. (The varieties accepted for inspection, 1954).

Pomme d. Terre franç. 1954 : 17 : No. 176 : 1-22.



The characteristics of 41 varieties of potatoes, accepted for inspection and control in France in 1954, are alphabetically tabulated to show: the genetic origin and breeder; morphological features of the tuber and plant; yield; disease resistance; earliness; soil requirement; use; and starch content.

- 3121 Siebzehnter Tätigkeitsbericht der Vereinigung Schweizerischer Versuchs- und Vermittlungsstellen für Saatkartoffeln (V.S.V.V.S.). [**Seventeenth report on the activities of the Association of Swiss Experimental Stations and distributive agencies for seed potatoes (VSVVS)**].  
1953 : Pp. 52.

This report includes an account of nine new wart-resistant varieties introduced from Germany and tested at various centres throughout Switzerland during the period 1951–52. All the varieties described produce tubers with a white skin and yellow flesh.

Atlanta (Konsuragis x Flava) is a high yielding, medium early variety of good eating quality and is highly tolerant of virus diseases. Concordia, a selection from Juli Sämling [July Seedling] x Flava Sämling [Flava Seedling], is resistant to scab and moderately resistant to late blight. It is medium-early in maturity and keeps well. Corona (Edelgard x Flava) is a medium-early variety of good eating quality. It gives a high yield under conditions of heavy rainfall but is extremely susceptible to drought. Erntedank [Harvest Thanksgiving], from Ackersegen x Flava, is a high yielding, medium-late variety of moderately good eating quality. Sieglinde, from Stamm [Stock] x Juli [July], produces tubers of moderately good eating quality. Agnes, from Allerfrüheste Gelbe [Yellow Earliest of All] x Sophie, is a high yielding late variety of attractive appearance and good keeping quality. Fichtelgold [Pine Gold], from [(Zwickauer Frühe [Zwickau Early] x Jubel [Rejoicing]) x Klara] x Böhm's Mittel-frühe [Böhm's Medium-early] possesses moderately good eating quality. Apta, from Wildbastard [Wild Hybrid] x Hindenburg, yields well, is moderately resistant to virus diseases and late blight and possesses good keeping properties. Virginia is a medium late, high yielding variety displaying good resistance to virus diseases.

- 3122 Station de Recherches de l'État pour l'Amélioration de la Culture de la Pomme de Terre, à Libramont. (**State Research Station for the Improvement of the Cultivation of the Potato, Libramont**).

Rev. Agric., Brux. 1953 : 6 : 1739–49.

A short survey of the virus diseases to which the potato is susceptible is followed by an account of breeding for resistance at the Libramont Station, Belgium. Of 25,000 lines resulting from crosses of *Solanum demissum* with *S. tuberosum*, approximately 1000 were resistant to *Phytophthora*. Breeding and selection of lines resistant to *Actinomyces*, *Heterodera rostochiensis* and the Colorado beetle are progressing satisfactorily.

- 3123 RUDORF, W.

Der augenblickliche Stand und die Aussichten der Züchtung resistenter Sorten der Kartoffel. (**The present state of breeding disease resistant potato varieties and future possibilities**).

Züchter 1954 : 24 : 48–55.

A comprehensive survey of recent progress in breeding varieties resistant to late blight, leaf roll, mosaic diseases and viruses X, Y and Z is presented, particular emphasis being placed on the development of strains possessing hypersensitive reaction to *Phytophthora*. The probable future trend of breeding to combine resistance to all the above diseases is outlined and the view expressed that the outlook in this respect is hopeful. At the Max-Planck Institute for Breeding Research, Voldagsen, the clone 46.151/4, derived from a cross with *Solanum antipoviczii* as the wild parent, is resistant to all known physiological races of *Phytophthora*; other hybrid clones formerly completely resistant to the pathogen have retained resistance in the field in the presence of new races through their inhibitory effect on the spore formation and development of the fungus; this type of resistance is termed incubation resistance.

- 3124 HOFFMANN, G. M.

Beiträge zur physiologischen Spezialisierung des Erregers des Kartoffelschorfes *Streptomyces scabies* (Thaxt.) Waksman and Henrici. [**Contributions to the physiological specialization of the pathogen causing potato scab *S. scabies* (Thaxt.) Waksman and Henrici**].

Phytopath. Z. 1954 : 21 : 221–78.

Considerable physiological specialization in *S.*

*scabies* was observed at the Phytopathological Institute of the Martin Luther University, Halle-Wittenberg, when ten varieties of potato were infected with scab. Ackersegen and Frühndel proved resistant to almost all of the races used in the experiments.

- 3125 COOPER, D. C., STOKES, G. W. & RIEMAN, G. H.

**Periderm development of the potato tuber and its relationship to scab resistance.**

Amer. Potato J. 1954 : 31 : 58-66.

Studies at the University of Wisconsin of 18 varieties indicate that resistance to *Streptomyces scabies* depends on the structure of the periderm. The periderm of resistant varieties consists of living nucleated cells, whereas that of susceptible varieties has an accumulation of disintegrated cells on the outer surface.

- 3126 BLACK, W.

**Late blight resistance work in Scotland.**

Amer. Potato J. 1954 : 31 : 93-100.

Investigations carried out at the Scottish Plant Breeding Station, Edinburgh, on the genetics of resistance of the potato to *Phytophthora infestans* and on races of the fungus are reviewed (cf. *PBA*, Vol. XXII, Abst. 2039 and Vol. XXIII, Abst. 2048). The author concludes that mutation rather than physiological adaptation is chiefly responsible for the origin of new races. He mentions some aspects of the problem of resistance meriting attention, such as (1) testing resistant seedlings in territories where conditions favour evolution of the parasite, and importing and classifying every new form that arises, (2) the persistence of specialized races under natural conditions or (3) the effect of different climatic conditions upon such races.

- 3127 RUSSELL, T. A.

**Potato blight in West Africa.**

Emp. J. exp. Agric. 1954 : 22 : No. 85 : 19-22.

In a preliminary trial at Bambui, British Cameroons, the following potato seedlings and varieties exhibited a high degree of resistance to *Phytophthora infestans*: seedlings 1521c(3), 1521d(24), 1522c(11), 1564a(14), 1565(4), 1664a(12), 1668b(7) and 1928e(2) from the Scottish Plant Breeding Station; Cherokee, Kennebec, Pungo, Placid, B73-10, B73-18 and B922-6 from the United States; and Canso and Keswick from Canada. In 1952 this fungus devastated the potato crop of the Bamenda highlands.

- 3128 MONTALDO BUSTOS, A.

El cultivo de las variedades de papas resistentes al tizón. (**The cultivation of potato varieties resistant to blight**). Bol. téc. Dep. Invest. agric., Santiago 1953 : No. 1 : Pp. 56.

A description is given of the fungus *Phytophthora infestans* and its sudden appearance in Chile in 1949. The most popular variety Corahila is fully susceptible, the varieties President, Llanquihuana, Sebago and Industrie show a certain degree of field resistance on account of their late maturity. In tests with Ackersegen, Voran and Merkur, the first two remained fairly free from blight and gave yields distinctly better than those of Corahila. Ackersegen in particular proved acceptable to some of the growers and was adapted to a wider range of areas than Voran. Merkur seemed less promising.

- 3129 TOXOPEUS, H. J.

Over de mogelijkheid voor de aardappelkwekers deel te nemen aan de selectie van voor *Phytophthora infestans* onvatbare aardappellrassen. (**On the possibility for the potato grower to take part in the selection of potato varieties resistant to *Ph. infestans***).

Meded. Ned. alg. Keuringsdienst Landbouwzaden Aardappelpootgoed. 1950 : 7 : No. 13 : unpaginated.

The damage caused to the Netherlands potato crop by late blight is discussed and the urgent need to combine disease resistance with good quality tubers is emphasized. It is urged that the potato grower cooperate with the research stations by carrying out crosses aimed at incorporating disease resistance into commercially acceptable varieties; the customary method of crossing *Solanum demissum* with a cultivated variety, followed by repeated backcrosses, is described and ways of testing for disease resistance are outlined.

- 3130 ESTRADA RAMOS, N.

El programa de mejoramiento en papa para obtener resistencia a la "gota" (*Phytophthora infestans*). [**The potato breeding programme to obtain resistance to blight (*Ph. infestans*)**]. Agricultura trop. 1954 : 10 : No. 3 : 51-57.

An account of the breeding material used at the National Centre of Agricultural Research, Tibaytata, Colombia, is given.

Lines from crosses of *Solanum demissum* x Tuquerreña with Tocana and Guasca possessing high resistance to blight and resistant introduced lines are listed. Data on promising strains



from crosses of *S. demissum* varieties with Branca cascada and Madison are also presented.

- 3131 FUCHS, W. H. & KOTTE, E.  
Zur Kenntnis der Resistenz von *Solanum tuberosum* gegen *Phytophthora infestans* de By. (**Information on the resistance of *S. tuberosum* to *Ph. infestans* de By.**).  
Naturwissenschaften 954 : 141 : 169-70.

In experiments at the Institute for Plant Pathology, Göttingen, certain chemicals, in particular sodium azide and phenylurethane, were found to neutralize the effect of the polyphenol produced by the potato variety Aquila, thus destroying its hypersensitive reaction to *Ph. infestans* and rendering it susceptible to infection.

- 3132 CASSERES, E. H., PETERSON, L. C. & REDDICK, D.  
Tres nuevas variedades de papas resistentes al tizón tardío. (**Three new potato varieties resistant to late blight**).  
Turrialba 1953 : 3 : 86-90.

The pedigrees of the new varieties Ticanel, Rosanel and Güetar, selected at the Inter-american Institute of Agricultural Sciences, Turrialba, Costa Rica, from breeding material obtained from Cornell University, USA, are presented. These varieties possess immunity, derived from *Solanum demissum*, to race A of *Phytophthora infestans* and give higher yields than other Costa Rican varieties. The white-flowered variety Ticanel produces short stems, luxuriant foliage and large, white tubers. Rosanel possesses small, dark green leaves and purple flowers. Its rounded, pink tubers have a starchy consistency and pleasant taste but do not keep well when stored. Güetar has a semierect growth habit and large smooth leaves. The tubers are white, of good quality and weigh between two and six ounces. The variety Harford is also described (cf. *PBA*, Vol. XVIII, Abst. 2308).

- 3133 KAMERAZ, A. JA.  
(**New *Phytophthora* and wart resistant potato varieties**).  
Sad i Ogorod (Gdn. & Veg. Gdn.) 1954 : No. 1 : 45-48. [Russian].

The new early varieties, Puškin and Detskoe Selo, are under trial at the Institute of Plant Industry and have proved resistant to *Phytophthora* and wart. The late variety Kameraz, obtained in recent years at the institute by distant hybridization involving *Solanum demissum* and the domestic varieties Granat [Pomegranate], Narodnyi [Popular] and Sickingen, is described.

- 3134 HUSZ, B.  
Über die *Colletotrichum*-Welkekrankheit der Kartoffel in Ungarn. (**On the *Colletotrichum* wilt disease of the potato in Hungary**).  
Acta agron. 1953 : 3 : 57-70.

This account of damage due to *C. atramentarium* includes information on differences in varietal reaction to the disease. Ella appears to be one of the most resistant varieties.

- 3135 JONES, F. G. W.  
**First steps in breeding for resistance to potato-root eelworm.**  
Ann. appl. Biol. 1954 : 41 : 348-53.

The text of a paper presented at a recent meeting of the Association of Applied Biologists is given in a slightly abridged form (cf. Abst. 2182).

- 3136 BAGNALL, R. H.  
**Hypersensitivity, a form of resistance to plant viruses in potatoes.**  
34 Rep. Quebec Soc. Prot. Pl. 1952 (1953) : 128-31.

An account of the mechanism of hypersensitivity in the potato is given and data on varietal differences in susceptibility to virus diseases in Canada are presented. In trials at Fredericton, New Brunswick, Warba and Sdl. F4519 proved the most resistant of nine varieties tested.

- 3137 MÜLLER, G.  
Ein Beitrag zur Frage der Resistenz auf Virusbefall und Ertrag bei 19 zugelassenen Kartoffelsorten. (**A contribution to the question of resistance to virus infection and yield in 19 authorized potato varieties**).  
Dtsch. Landw., Berl. 1954 : 5 : 177-82.

Statistical data on the progressive increase in virus infection through four generations of planting are provided for 19 officially recognized varieties cultivated in Eastern Germany. The trials, conducted at Müncheberg during the period 1950-53, were concerned primarily with leaf roll, streak, crinkle and mosaic. In the third generation, Capella showed least infection and least percentage decrease in yield. In the fourth generation Aquila and Cornelia possessed the least degree of infection; Flava and Capella, although slightly more infected than Aquila and Cornelia, showed a smaller percentage decrease in yield.

- 3138 EIKELAND, H. J.  
Forsøk med tidlige og halvtidlige potet-sortar i åra 1945-1953. (**Trials with early and medium-early potato varieties in 1945-53**).  
Bondevennen 1954 : 57 : 195-97.

Except for the inclusion of additional results

obtained in 1953, this article covers the same ground as Selsjord's report (cf. Abst. 3108). The new wart-immune early Swedish variety Eva has surpassed Epicure in total yield and in the percentage of marketable tubers. The variety 140/40, distinguishable from its parent Kerr's Pink by its reddish purple flowers, has large tubers and can be used for the table, though they are not equal in quality to Kerr's Pink as a winter potato; its dry matter content is low and it is not very resistant to blight.

3139 EIKELAND, H. J.

Forsøk med matpotetsortar i åra 1945-53. (**Trials with table potatoes during 1945-53**).

Bondevennen 1954 : 57 : 210-13.

The performance of Norwegian and other table varieties of potatoes, including the Kerr's Pink somatic mutant, Kvit Kerrs Pink [White Kerr's Pink], Jøssing, 140/40, Kerr's Pink and Saga, in trials at the Forus Experimental Station, Norway, and in outlying localities is discussed. The concluding recommendations of particular varieties for various districts are based on observations on disease resistance, size and yield of tubers, quality and suitability for table or other use. The Kerr's Pink mutant has so far given a somewhat larger and healthier crop than the ordinary Kerr's Pink.

3140 EIKELAND, H. J.

Forsøk med fôr- og fabrikkpotetsortar i åra 1945-53. (**Trials with fodder and industrial varieties of potatoes in the year 1945-53**).

Bondevennen 1954 : 57 : 228-31.

The varieties tested in these Norwegian trials included Ås, Parnassia, Jøssing and Dianella, all of which are immune to wart. Parnassia, Jøssing and Dianella, which proved to be productive varieties with a high dry matter content, are recommended as the best and also the most suitable for combined fodder and industrial use or for industrial purposes only. Though neither Jøssing nor Dianella are specially resistant to blight and they are readily damaged by virus attack, both can be recommended for cultivation as soon as seed free from virus X is available. Ås is not suitable for industrial purposes owing to its low dry matter content, but its productivity, superior resistance to blight and good keeping properties indicate its value as a fodder variety.

3141 MENEZES, O. B. DE

II—Melhoramento de batata doce. Genética da batata doce. (**II. Sweet potato breeding. Genetics of the sweet potato**).

Ceres, Minas Gerais 1953 : 9 : 189-93.

Observations were made (cf. Abst. 449) on the open-pollinated progeny of Peçanha Rosa [Pink Peçanha], a variety with green stems. Segregation occurred for stem colour, pink stems occurring in the proportion 1 pink : 3 green. In the progeny of the variety Cinco Bicos [Five Points], having white skin, root and flesh, monohybrid segregation occurred for red skin and cream-coloured flesh, each of which was recessive to white and inherited independently. The variety Nacional, with narrow dissected leaves, showed a wide range of leaf types in its progeny, but cordiform seemed to be dominant to noncordiform.

It is not yet decided whether the segregation of these varieties is due to their heterozygosity or to cross pollination.

3142 MOU, C.-S., LIN, C.-H. & PENG, W.-H.

(**Results of trials of new locally bred sweet potatoes in the northern area**).

Nungyeh Yenchiu/Agric. Res., Taipei 1952 : 3 : No. 1 : 22-36. [Chinese].

Four new types bred in Taiwan were tested in 1951 at five localities in the north of the island against standard varieties. P30 (Tai-nung 27 [Taiwan Agriculture 27] x Tieh-hsien-teng [Wiry Vines]) gave the maximum yield; P46 (Tai-nung 44 x Mei-kuo-huang-pi [American Yellow-skinned]) had the best flavour.

3143 CAMARGO, A. PAIS DE

Novos tipos de batata doce oriundos de mutação somática. (**New types of sweet potato arising from somatic mutation**).

Bragantia 1952 : 12 : 315-19.

Six somatic mutations have been encountered in sweet potatoes at the research station at Campinas in Brazil; the first is a form with cream-coloured skin and flesh which arose in the variety 98-Castelo, with red skin; the second is a form with pink skin and cream-coloured flesh from 18-Viçosa (= Dahomey), a variety with red skin and flesh. Other mutants include a form with pink skin and cream-coloured flesh from the variety 39K-Roxa pilosa [Red Hairly 39K], with red tubers, and from the variety 113-Ecologia, which has yellow skin and flesh, a mutant with mauve skin and red flesh.

The first two mutants, which are identical with the original forms in everything but skin colour,



are regarded as distinct improvements on the parents and rank among the best varieties now available for cultivation.

- 3144 KEHR, A. E., TING, Y. C. & MILLER, J. C.

**Induction of flowering in the Jersey type of sweet potato.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 437-40.

Orange Little Stem was grafted on to *Ipomoea ruber* and *I. carnea* rootstocks, which do not produce storage organs, at the Louisiana State University. The resulting accumulation of carbohydrates in the stem and foliage of the scion induced flowering. Flowering was not induced by the transmission of a stimulus from rootstock to scion or by variation in photo-periods.

- 3145 IURA, M.

**(Research on the sprouting behaviour of sweet potato varieties).**

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 286-87. [Japanese].

Data are provided on the sprouting date, number and length of sprouts, number of nodes of the sprouts, number and length of slips obtainable, number of nodes of the slips, and internodal length of 32 Japanese varieties. Correlations were observed between length of sprouts and date of sprouting, number of slips and length of sprouts, number of slips and internodal length, and, less markedly, between number of slips and number of sprouts.

- 3146 FUJISE, K., CHISHIKI, T. & YUNOUE, T.  
**(On the combining ability of sweet potato varieties. Variation in the yield and dry matter percentage of the tuberous roots of the  $F_1$ ).**

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 284-85. [Japanese].

The relations between fresh weight, dry weight and dry matter percentage were investigated in the  $F_1$  of a series of crosses between Japanese varieties. Fresh and dry weights were highly correlated. The higher fresh weights, however, were associated with only medium values (30-38%) for dry matter percentage.

## FIBRES

- 3147 Les cahiers de la recherche agronomique 4. **(Records of agronomic research 4).** Serv. Rech. agron. Exp. agric., Rabat 1951 : Pp. 526.

In addition to information on the crops

mentioned below, data on other experiments and breeding work conducted in Morocco on *Hibiscus*, *Abutilon avicennae* and *Urena lobata* are given.

Grillot, G. *Étude et amélioration des lins textiles. (Study and improvement of textile flax).* (pp. 27-75).

A historical survey of flax cultivation in Morocco is given, together with sections on the cytology and genetics of the plant, its morphology, varieties cultivated in Morocco and their comparative merits and attempts to produce dual-purpose flax by crossing linseeds with fibre-flax varieties.

Clavier, C. *Note sur la sélection conservatrice du lin. (Note on the protective selection of flax).* (pp. 79-87).

The problem of natural cross pollination leading to varietal deterioration is discussed; examinations carried out by the Agricultural Research Centre, Rabat, on flax crops in Morocco have shown that varietal purity is often seriously impaired within three generations of planting the original pure seed. Greater care in selecting seed for future sowing is advocated.

Ilitis, J. *Étude de l'influence de la colchicine sur une variété de lin. (Study of the influence of colchicine on a variety of flax).* (pp. 91-96).

Polyploid plants growing at the Agricultural Experiment Centre, Rabat, Morocco, from seed that had been germinated in a colchicine solution were slightly larger than the diploid controls and produced grain that was thicker, rounder and more pigmented than that of untreated material.

Dufresse, M. *Essais culturaux sur le cotonnier (années antérieures à 1951). [Cultural experiments on cotton (years before 1951)].* (pp. 101-29).

This account of cotton cultivation in Morocco includes a brief note on the selection of suitable varieties. Pima 67 gives the highest yields of high-quality long-staple cotton.

Ilitis, J. *Les recherches cotonnières au Maroc de 1947 à 1950. (Cotton research in Morocco from 1957 to 1950).* ((p. 135-202).

After a preliminary survey of the literature on cotton systematics and genetics, an account of the work of the Rabat Agricultural Research Station in testing and introducing new varieties is given. Tabulated data on the yield, quality and length of lint, susceptibility to diseases and time of maturity are presented for the principal

varieties under observation; in the period under review, Pima 67, Giza, Malaki, Zagora and Coker 100 gave satisfactory results in trials. The new Egyptian varieties Malaki, Amoun and Karnak are thought to provide valuable breeding material; selection from these strains will be directed towards increasing the yield and obtaining lines that mature earlier. American varieties have proved extremely susceptible to jassid attack; attempts are being made to incorporate the resistance of some local varieties to this pest into Coker 100.

*Iltis, J. Travaux effectués en 1951 sur le cotonnier. (Work accomplished in 1951 on cotton). (pp. 205-21).*

At the Rabat and Krazza Research Stations, mass pedigree selection of Pima 67 has resulted in the line M1-510, which gives higher yields and matures earlier than the original material. The progeny of the cross Pima 67 x Tangüis have proved resistant to jassid.

*Magne, C. Le chanvre et son amélioration. (Hemp and its improvement). (pp. 229-302).*

The literature on the history, systematics, cytology, genetics and cultivation of hemp is surveyed and an account of current research work on the breeding of hemp given. At the Agricultural Research Centre, Rabat, a number of recently introduced varieties are undergoing trials; data on the comparative yields of recently introduced and already established varieties are given.

*Iltis, J. Essais sur le chanvre. (Trials on hemp). (pp. 305-13).*

The comparative yields, times to maturity and optimal planting distances were determined for a number of native and foreign varieties in trials conducted at Rabat in 1948. Sefrou gave the highest yields of both fibre and seed.

*Iltis, J. Travaux effectués en 1951 sur le chanvre. (Work accomplished in 1951 on hemp). (pp. 325-27).*

The results of variety trials conducted during 1951 are given. Sefrou and Fatza gave the highest yields.

*Franquin, P. La ramie. (Ramie). (pp. 333-411).*

An account of the botany and genetics of ramie, of the morphological characters of the different types and of the effect of day length on flowering is followed by a report of progress achieved in 1949 at the Rabat station in selecting lines giving a higher yield and possessing better quality fibre.

*Iltis, J. Travaux effectués en 1951 sur la ramie. (Work accomplished in 1951 on ramie). (pp. 415-17).*

The comparative yields and fibre contents of selected lines of ramie at the Rabat Agricultural Centre are given.

*Arnoux, M. Le jute. (Jute). (pp. 425-39).*

An account of the botany, genetics and systematics of the jute plant is presented, together with an account of breeding material in the possession of the Agricultural Research Centre, Rabat.

*Iltis, J. Le jute. Comptes rendus des travaux effectués en 1950. (Jute. Account of work accomplished in 1950). (pp. 440-45).*

An account of experiments with jute during 1950 is given, including information on selection and variety trials.

3148 *BEREZNAKOVSKAJA, A. V. (Breeding cotton by raising under conditions of low temperature). Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 170-77. [Russian].*

Seedlings of *Gossypium barbadense* and *G. hirsutum* growing in the hothouse were on 10 March placed for 25 days in a cold frame and then planted out in the open; this treatment caused an increase of 4-6 days in earliness of ripening and of 26-58% in yield of raw cotton. The same treatment was repeated with the next generation of plants, which reached maturity 5-7 days before the control in varieties 7389, S-15-2 and 30a, and exceeded the controls in yield by 20, 80 and 130% respectively; other varieties on the other hand showed no improvement over the previous generation. In *G. barbadense* 7389 the changes were accompanied by segregation in morphological characters and selection among the segregates led to the production of a line which exceeded the parent by 10-11 days in earliness, by 1 g. in boll weight and 130-160% in yield, and had stronger lint. The varieties which give the greatest response to treatment are thought to be young, plastic forms whose hereditary constitution has not yet become conservative.

3149 *HINTZ, G. D. & GREEN, J. M. Components of earliness in Upland cotton varieties. Agron. J. 1954 : 46 : 114-18.*

In experiments at the Oklahoma Agricultural Experiment Station, the early cotton Oklahoma Special and late varieties Stormproof # 1 and



Lankart were compared with respect to rate of squaring (bud production), rate of blooming, length of squaring period, rates of boll growth, and length of boll period, i.e. duration of time from blooming to boll opening. The lateness of Stormproof # 1 and Lankart 57 had a dissimilar origin: compared with Oklahoma Special, Stormproof # 1 was late as the result of (1) delayed appearance of squares and flowers, and (2) slower rate of squaring and blooming, whereas Lankart 57 owed its late maturity to (1) slower rate of squaring and blooming and (2) longer boll period. Boll period appeared to be largely controlled by genes with additive effects.

3150 MAKSIMENKO, I.

(Some questions concerning cotton breeding).

Hlopkovodstvo/(Cott.-growing) 1954 : No. 5 : 22-27. [Russian].

A form of *Gossypium barbadense* with shorter internodes and lower growth than the commercial varieties of this species has been produced by Mičurinist treatment of a segregating hybrid and is referred to as 5476-I. For the first 70 days the new variety looks like Pima and the other typical varieties, but after that it suddenly enters into a phase of concentrated development of fruits and seeds and vegetative development almost ceases. In the Turkmenian USSR it has given 18-21% more raw cotton and 33-34% more lint than 2IZ, the variety previously grown there. Its lint length is the same, the strength is greater but the metric number is somewhat lower than in 2IZ and the lint is not quite so acceptable to the spinners.

Reference is also made to variety 8704-I, which loses almost all its leaves at maturity and is thus very suitable for mechanical picking; it also ripens its bolls more quickly than other varieties and so escapes damage by autumn frosts.

3151 PATEL, C. T. & PATEL, G. B.

Long staple Indo-American cotton type 170.

Indian Cott. Gr. Rev. 1954 : 8 : 27-31.

Indo-American 170, derived from crosses involving Dharwar-American 2-6-5, Gaorani 6 and Madras Co2, has a longer staple than the parental types and is more adaptable than American varieties. In trials conducted by the Bombay State Department of Agriculture, Indo-American 170 has proved superior in fibre qualities, and equal in yield, to Co4-B-40, Co2, Suyog and 2087. The best results were obtained on *gorat* soils under nonirrigated conditions.

3152 Report on the study of hybrid vigour of Sea Island x Cambodia cross.

Indian Cott. Gr. Rev. 1954 : 8 : 83-84.

Comparative data based on trials at Coimbatore and at the West Coast Stations, Pattambi and Mangalore, of Co2, Sea Island V135 and the F<sub>1</sub> of a cross between these varieties are presented. The hybrid was superior in yield to the parental varieties and intermediate in fibre quality. It gave better results under west coast conditions than in Coimbatore.

3153 PUDOVKINA, Z.

(Influence of light on earliness and yield of cotton).

Hlopkovodstvo/(Cott.-growing) 1954 : No. 6 : 40-51. [Russian].

A number of varieties differing in earliness were subjected to short days and to continuous light at different stages of development. The results show that treatment of the late-maturing variety S-460 with short days at any stage of development led to earlier flower-bud formation and maturity; when the short days were continued during the period of flowering to maturity an acceleration of 13 days in maturity resulted. Continuous light in the early developmental phases caused a delay of 10 days in flower-bud formation and most of the buds failed to develop. The early variety S-3210 on the other hand showed little or no reaction to either short or long days. Some of the hybrids of S-460 reacted more strongly than the parent itself to short-day treatment; thus hybrid S-460 x S-3404 matured 18 days earlier when treated with short days from germination to maturity and hybrid S-3316 x S-460 was 18-20 days earlier whenever the treatment was applied; in all cases the period most reduced by the treatment was that from flowering to maturity, the reaction to short day in the phase from germination to flower bud formation being less marked. The effect of short day in increasing earliness was greater when the plants were grown at relatively high temperatures that favoured growth.

In all the above cases an increase of earliness was accompanied by a proportional rise in yield.

3154 BROWN, L. C. & RHYNE, C. L.

Chemical defoliation of cotton. II. The influence of boll maturity on the defoliability of species and varieties of cotton.

Agron. J. 1954 : 46 : 128-32.

Interspecific and intraspecific differences in amount of chemically induced defoliation were

detected in experiments at the US Field Station, Sacaton, Ariz. In most commercial varieties the percentage of defoliation was influenced by the stage of boll maturity at the time of applying the chemical. Certain inherent characteristics, not yet determined are, however, associated with good or poor defoliation in a species or variety, irrespective of the stage of boll maturity. It is suggested that defoliability should be considered in breeding programmes.

3155 TER-AVANESJAN, D. V.

**(Biology of pollination and flowering in cotton).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 149-69. [Russian].

A description is given of the flower in a number of species of *Gossypium*. Removal of the bracts in the early stages retarded the development of the bolls. By removing the styles at various intervals after pollination it was shown that 10-12 hr. were necessary for the pollen tubes to reach the ovary; over 120 pollen tubes develop in each style and a great number of them normally reach the ovule. The pollen grains in the upper stamens were smaller than those from the lower and proved less effective in performing fertilization, and the plants produced from fertilization with the large grains were more vigorous.

Plants of a green-leaved form of *S. hirsutum* growing at a distance of 5 m. from a red-leaved form contained 0.69% of red-leaved individuals in their progeny, and the red form gave rise to progeny containing 1.01% green plants. It is thus concluded that the considerable amount of insect visitation which has been observed on the flowers leads mainly to self pollination rather than cross fertilization. Data are given on the insect species that visit the flowers and the further conclusion is reached that bees are the only ones that play any part in cross pollination.

In an experiment on selective fertilization, 30 emasculated flowers of the variety Šreder 1306 were pollinated with a mixture of pollen from Šreder 1306 and the red-leaved variety k-1677; 486 seedlings were obtained, of which 78.3% were of the Šreder type and 21.7% intermediate, showing a clear preference for self pollen. In another experiment 40 emasculated flowers of the variety 8582 were pollinated with a mixture of self pollen and pollen from k-1665; of the 562 seedlings obtained, 69.8% were intermediate in colour, showing that in this case the foreign pollen had been selected, and

when the Transcaucasian variety 915 was pollinated with self pollen and pollen of 8582 as many as 81.2% of hybrid seedlings resulted. Intravarietal crossing without emasculation led to an increase in yield of raw cotton of 8.4% in Šreder 1306, 14.4% in 8582 and 22.0% in 915. When emasculated flowers of the variety 35-1, which has deep yellow pollen, were pollinated with a mixture of self pollen and pollen from k-1665, which is white, 64.0% of the seedlings were hybrids and showed clear signs of heterosis; the same pollen mixture when applied to the k-1665 parent produced only 48.0% of hybrid seedlings, from which it is concluded that the deciding factor is the biological compatibility of the pollen with the organism rather than its carotenoid content.

In a further experiment the varieties 0491, 0246, 01064 and 114 of *G. hirsutum* were planted in alternating rows with a red-leaved variety; the percentage of red-leaved seedlings in the progenies of the four varieties was respectively 0.18, 0.34, 0.56 and 0.71. From alternating rows of Ashmuni (*G. barbadense*), a variety with dissected leaves, and the commercial variety 18819 of *G. hirsutum* sown at Taškent, the percentages of hybrid progeny were 6.9, 9.4 and 5.3 respectively. When emasculated flowers of the broad-leaved variety 8517 of *G. hirsutum* were pollinated with a mixture of self pollen and pollen from a variety of *G. hirsutum* with deeply dissected leaves, the proportion of hybrid seedlings was 20.3% when the pollen was applied at 8.00 hr. and gradually rose with increasing delay in application, being 78.4% in pollinations effected at 14 hr. The number of pollen grains also affected the results of pollination; when emasculated flowers were pollinated with only 20 pollen grains the pollen tubes reached the ovary after 15 hr., whereas after pollination with an unlimited number they reached the ovary after only 8 hr.

3156 FINKNER, M. D.

**The effect of dual pollinations in upland cotton stocks differing in genotype.**

Agron. J. 1954 : 46 : 124-28.

Investigations were carried out on the efficiency of the pollen of the Upland stocks Virescent Yellow (*rrvv*), Red Leaf (*RRVV*), Green Leaf (*rrVV*) and the heterozygous stock *RrVV* (cf. Absts. 2220-1). The results from dual pollinations of the common female parent, Virescent Yellow, showed that Red Leaf pollen was superior to that of other stocks in effecting fertilization. Differences in the pollen efficiency



of Red Leaf and Green Leaf were not associated with any advantage of pollen with *R* over that carrying *r*. The pollen applied first in the various dual applications usually had an advantage but pollen applied later fertilized a considerable number of ovules, even with an interval of 2 hours between the pollinations; time of anthesis may not therefore be such an important factor in influencing the proportion of natural crossing as has been generally supposed.

- 3157 MATUO [MATSUO], K. & MIZUNO, S.  
**[On the occurrence of sterile anthers in the staminal column of the Malvaceae (cotton and kenaf)].**  
 Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 321-22. [Japanese].

Anthers containing empty pollen grains have been observed in the staminal column of the above two species. The cause appears to be fluctuating temperatures while the buds are developing.

- 3158 SIKKA, S. M. & AVTAR SINGH  
**Record of a dominant mutant in Punjab-American cotton (*Gossypium hirsutum* L.).**  
 Indian J. Genet. 1953 : 13 : 104-05.

A mutant with abnormal shape of the petals, originating from strain 359 F (reselection of Punjab-American LSS), was found to depend upon a single dominant gene.

- 3159 **Annual Report of the Director, Technological Laboratory of the Indian Central Cotton Committee for the year ending 31st May, 1953 :**  
 Pp. 36.

Of the varieties Virnar, Jarila, H 420 and Pratap grown in Khandesh, Jarila had the shortest, though finest, staple. H 420 and Pratap gave better spinning values than Virnar. In South Gujarat 77-2 and 2087 gave finer staples and better spinning performances than Suyog. Longer and finer staples and better spinning performances were obtained from 170-Co 2, 134-Co 2 M, 68 x 22 and BC 68 than from Co 4-B40. Gumala gave the strongest yarn, and of the *hirsutum*-type Hyderabad tree cottons, Coker had a longer and finer staple than 216 F and 23 F when grown at Aduturai. Variety 2087 gave stronger yarn than Suyog in Madras, and at three out of four centres Virnar gave stronger yarn than Jarila. During seed multiplication, 1027 ALF, Suyog, Vijay, Kalyan, Parbhani-American, Westerns and K<sub>2</sub> have given the same spinning performance up

to the 5th stage. Of the standard Indian cottons, Gadag 1 and Cambodia Co 2 showed improved spinning quality and 216 F had a longer staple than Jayadhar and Laxmi and a finer staple than Jayadhar.

- 3160 SELF, F. W. & HENDERSON, M. T.  
**Inheritance of fiber strength in a cross between the Upland cotton varieties AHA 50 and Half and Half.**  
 Agron. J. 1954 : 46 : 151-57.

In the cross of AHA 50 with Half and Half, varieties with high and low fibre strength respectively, strength was quantitatively inherited. From F<sub>2</sub> and F<sub>3</sub> data it was concluded that a mean difference of approximately 2.5 Pressley index units was probably governed by 4 or 5 pairs of genes, each pair making an average contribution of 0.5 to 0.6 of a unit. Heritability of strength was estimated as 53%. Selection of F<sub>2</sub> plants for strength would have been highly effective in obtaining outstanding lines, as shown by comparing F<sub>2</sub> plants possessing superior strength with their F<sub>3</sub> lines. In general, selection of approximately 20% of the F<sub>2</sub> plants for strength is recommended in breeding.

- 3161 NANJUNDAYYA, C.  
**Technological reports on standard Indian cottons 1953.**  
 Technol. Bull. Indian Cott. Comm. 1953 : No. 85 : Pp. 98.

A detailed report on the fibre and spinning qualities and agronomic characteristics of standard Indian cotton varieties is presented, together with tables showing the range in variability of their fibre properties. Laxmi, Vijay, Punjab-American LSS, Cambodia Co 2 and Nandyal 14 had better spinning qualities in the 1952-53 season than in the previous year.

- 3162 TER-AVANESJAN, D. V. & ŽITLUHINA, N. P.  
**(Biological study of initial breeding material in cotton).**  
 Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 178-86. [Russian].

A study was made of 40 varieties from the world collection grown in Taškent under good, medium and poor soil conditions; the varieties differed sharply in their response to good conditions, and some of those which gave the best results under good conditions suffered badly under poor conditions. The varieties most tolerant of both good and bad conditions were k-3424, k-3473, and the hybrid k-503 x k-1650.

Crosses were made between varieties of the

different response types, the  $F_1$  hybrids being grown on normal soil and the  $F_2$  on all three types. The  $F_2$  from two varieties with good response gave a much higher response to good conditions (45.3% increase over normal) than the  $F_2$  from two varieties of low response (only 17.3% over normal), and it is suggested that tests of response in this way offer a better means of choosing favourable parental combinations than the methods commonly used by plant breeders.

- 3163 KNIGHT, R. L.  
**Cotton breeding in the Sudan. Part I. Egyptian cotton.**  
 Emp. J. exp. Agric. 1954 : 22 : No. 85 : 68-80.

The author gives a concise survey of genetical and breeding work carried out in the Sudan on resistance to blackarm and leaf curl in Egyptian cotton.

- 3164 KNIGHT, R. L.  
**The genetics of blackarm resistance. XI. *Gossypium anomalum*.**  
 J. Genet. 1954 : 52 : 466-72.

Blackarm resistance in *G. anomalum* depends upon a single recessive gene,  $b_8$ . When transferred to a susceptible strain of *G. arboreum* by back crossing, the gene conferred a lower grade of resistance than it imparted to the parental *G. anomalum*. The greater resistance of *G. anomalum* is presumed to be due to a subsidiary type of resistance caused by the capacity for rapid leaf hardening evolved in response to the requirements of a xerophytic environment. Gene  $b_8$  is closely linked with  $R^{OS}$  for petal spot in *G. anomalum*.

- 3165 EŽKINA, A. N.  
**(Intravarietal and intervariatal crossing in flax).**  
 Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 62-68. [Russian].

Several varieties corresponding to different types were sown in alternating rows and intervariatal crossing was performed by bringing together flowers of two adjacent varieties, without previous emasculation. The proportion of crossed seed varied in the different combinations, and the time at which crossing was effected; the highest proportion was in Sicilian K-2545 x Dutch K-3920; some of the progeny of crosses performed in the early hours of the morning had large flowers like the Sicilian parent but white petals like the Dutch parent, whilst others had flowers intermediate between

the two parents in type. In 6 of the 20 combinations the progeny exceeded the taller parent in height by amounts varying from 5 to 18 cm.; in 7 combinations the progeny were intermediate and in 6 they were roughly equal to the shorter parent. The 1000 seed weight exceeded that of the heavier parent by 2-3 g. in 7 combinations, in most of the others it was equal to that of the heavier parent.

Pollination of emasculated plants with pollen from plants of the same variety grown under a different system of manuring occasioned increases in stem height of 7-19.8 cm., and in 1000 seed weight of up to 0.98 g. in the Russian variety Svetoc [Torch] but in the variety Dutch K-3920 the increases were only 2-6 cm. in height and 0.5 g. in 1000 seed weight; the plants from intravariatal crossing flowered earlier.

- 3166 SIZOV, I. A.  
**(Characteristic features in the performance of the phasic changes by different varieties and forms of flax).**  
 Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 69-123. [Russian].

The literature on vernalization of flax is examined critically, and experiments are reported in which the requirements of the different groups of flax (cf. Abst. 3168) for the completion of their phasic development were studied. The northern group has a short vernalization phase, 5-8 days at 4-6°C, and tolerated even higher temperatures; the semi-winter group from the Caspian and Black Sea areas on the other hand required 12-18 days at 2-3°C. The linseed groups varied in requirements according to their place of origin. Varieties also differed in the degree to which their development was retarded by treating them with temperatures of -2 and -3°C during the vernalization phase; varieties with a tendency to branching gave large increases in the number of stems and capsules per plant after such treatment, or after winter sowing. All varieties retarded their development when the length of day was reduced, the most sensitive being the northern fibre flaxes and those of the southern Altaï region; flowering was delayed in the southern varieties more than in the northern fibre group but the adverse effect on general development was much less pronounced. All varieties accelerated their development when subjected to continuous light. The duration of the photostage varied in different varieties from 20 to about 36 days, being



shortest in the northern fibre group and longest in the semiwinter group from Asia Minor.

Data and illustrations are presented showing the creation of varieties representing different groups when subjected to short-day treatment at various stages of development and at different temperatures, and to variations in time of sowing and other agricultural measures.

3167 SIZOV, I. A.

**(The light phase of flax varieties).**

Agrobiologija (Agrobiology) 1954 : No. 1 : 60-67. [Russian].

Methods of determining the initiation and duration of the light phase in *Linum* forms are discussed. Mention is made of new vigorous fibre flaxes that outyield the standards in Leningrad; they were obtained by crossing distant forms on the basis of their phasic requirements. Some of the new forms are 135-140 cm. tall, others yield 50-70% more seed than the standards. The seed is 50-60% larger than the seed of familiar varieties.

3168 SIZOV, I. A.

**(Biological characteristics of varieties and forms of flax and their utilization in breeding).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 5-51. [Russian].

Indications are given of the range of variation in different characters observed in the world collection of flax at Leningrad, which comprises over 4000 different forms. The extent to which the different characters are influenced by environmental factors is discussed and certain correlations of characters are noted. Among the crosses made in the hope of producing a dual-purpose type, some hybrids in 1950 bore stems of the fibre type but had a thousand seed weight of 7-9 g.; in stem height and fibre quality some of them were even better than the standard; the oil content of the seeds was, however, less; the stems were also thicker and maturity somewhat later than in the best fibre flaxes.

The cultivated flaxes are divided into five classes: (1) true fibre flaxes, (2) dual-purpose forms, (3) highland linseeds (4) large-seeded linseeds and (5) semiwinter many-stemmed linseeds, each of which is described fully. The best forms in group (1) are the Russian varieties, old and new, and those from the Baltic region, typified by the Pskov flax; some of the land races are mixed in respect of both morphological

and physiological characters and display greater climatic adaptability than the selected varieties. The dual-purpose group is more resistant to lodging and contains forms also resistant to drought, those from the Kazah SSR being the most drought-resistant flaxes known and having served as the starting point for a number of drought-resistant selections. The third group, too, contains forms resistant to drought and also to frost; several improved forms have been selected from local populations of the southern USSR; some of the Chinese forms possess resistance to *Fusarium* and rust, as do the large-seeded linseeds of the Mediterranean, from some of which high-yielding, drought-resistant selections have been made which have a thousand seed weight of 7.5-9 g. and at the same time give quite a good yield of fibres. The so-called prostrate forms, with 5-14 or more stems, are found almost exclusively in the neighbourhood of the Caspian Sea; they are resistant to anthracnose but susceptible to drought and to *Fusarium*; they are semiwinter forms and this habit is dominant in crosses with all other forms, from which it is concluded that this group represents a very ancient form.

Data are presented concerning the different phases of development of the flax plant and the time taken for their completion, the floral biology and methods of hybridization, and the effect of planting conditions, phasic development and other factors on yield of fibre and seed quality; the largest seeds are found in the Mediterranean varieties; no regular geographical trends can be detected in respect of oil content and a number of other characters; the southern forms are less depressed by short days than are the tall northern forms. These latter would seem to have originated in the northern areas of Russia, whence they were later introduced to Great Britain and elsewhere where they served as the starting point for local selection and breeding work; the present-day dual-purpose forms of the Soviet Union are very similar in type to the flax found in Egyptian remains and probably originated in that part of the world, just as the highland linseeds seemingly originated in Central Asia and the adjacent parts of Asia and Africa; the semiwinter group appears to have arisen in the Caspian Sea area and the large-seeded linseeds in Egypt. The classification of *Linum usitatissimum* by previous authors is examined and the subspecies or species established by some authors are considered unacceptable, the wide range of types existing within the species being regarded as an expression of the adaptability of the species.

- 3169 ANTROPOV, A.  
(**Problems of promoting flax cultivation**).

Socialist. Sel'sk. Hozjaistvo (Socialist. Agric.), Moscow 1954 : No. 5 : 40-56. [Russian].

A new variety developed at Smolensk and designated L1120 is described. It gives a high yield of good quality fibre and is resistant to lodging. The varieties 806-3, 1288-12 and Svetoč [Torch], which have similar properties to L1120, are also mentioned.

- 3170 HOFFMANN, G. M.

Beobachtungen über die Bräune und den Stengelbruch des Leins (*Polyspora lini* Laff.). [**Observations on browning and stem-break in flax (*P. lini* Laff)**]. NachrBl. dtsch. PflSchDienst, Stuttgart 1954 : 8 : 41-45.

An account of the incidence of *P. lini* in central Germany is given. In trials at Aschersleben, Endress Öllein [Endress linseed] proved the most resistant variety.

- 3171 LARSEN, A. & BAGGE, H.  
Forsøg med sorter af spindhør. (**Trials with varieties of fibre flax**).

Tidsskr. Planteavl 1954 : 57 : 458-97.

During the years 1933-52, 41 varieties of flax of Danish, Swedish, German, Dutch, Latvian and Irish origin were tested in trials at various experimental stations in Denmark. Tabulated data on yields of seed, straw, long fibres and tow, tendency to lodging and time of ripening are accompanied by a commentary on the characteristics and performance of the different varieties tested during the periods 1933-39, 1940-48 and 1949-52.

- 3172 CRESCINI, F.

Associazione di fattori genetici (linkage) in *Cannabis sativa* L. (**Linkage in *C. sativa* L.**).

Caryologia 1953 : 5 : 288-96.

Plants in which the hypocotyls were red and the first pair of epicotyledonary leaves were bronze-coloured were crossed with plants in which these parts were green. In the  $F_1$  colour was dominant. In the  $F_2$  3:1 ratios occurred for colour of hypocotyls and for colour of the first leaves but when the two characters were observed together the  $F_2$  and back-cross ratios showed them to be due to two linked factors, with 29.62% of crossing-over.

Full development of the pigments did not occur when the plants were grown under glass or at high temperatures and all the genetical observations were made on plants grown out of doors.

- 3173 **New hemp strain produced.**

What's New Crops Soils 1954 : 6 : No. 7 : p. 29.

A new strain, reported by the US Department of Agriculture, with male and female flowers on the same plant, matures more uniformly and gives a better quality fibre than present commercial varieties.

- 3174 MATUSIEWICZ, E.

Fotoperiodyczna reakcja konopi w zależności od wieku roślin. (**The photoperiodic reaction of hemp in relation to the age of the plants**).

Roczn. Nauk rol. 1953 : 68 : Ser. A : No. 1 : 53-64.

All of eight groups of Hungarian hemp, each of which was subjected at a different stage of vegetative development to a photoperiod of 10 hours for 30 days, outyielded control plants grown under normal long-day conditions. Photoperiodic reaction was considerably influenced by the age of the plant, older plants requiring fewer short days to induce flowering than young plants; they also gave higher yields. Time from sowing to maturity was, however, the same in all groups, viz. 70 days, compared with 141 days in the control. The ♀ plants proved more sensitive to the influence of short photoperiods than the ♂ plants.

- 3175 DAS GUPTA, B. & SARMA, M. S.

**The genetics of *Corchorus* (jute). VI. Inheritance of a new anthocyanin pigmentation pattern in *Corchorus capsularis*.**

J. Genet. 1954 : 52 : 374-82.

The occurrence of a new member,  $A^D$ , of the multiple allelomorphic series controlling intensity and distribution of anthocyanin pigmentation is reported (cf. *PBA*, Vol. XVI, Abst. 557 and Vol. XX, Abst. 1029). The highest intensity and greatest distribution of anthocyanin pigmentation are associated with  $A^D$ ; the alleles are therefore now placed in the following order of decreasing effect,  $A^D-A^R-A^L-A-a$ . The genotype of the dark red type studied has been identified as  $CCA^DA^Drr$ . Four new genotypes have been isolated from appropriate crosses:  $CCA^DA^DRR$ , termed green-dark-red; and three full-green types,  $ccA^DA^Drr$ ,  $ccA^RA^RRR$  and  $ccA^LA^Lrr$ . A system of nomenclature and grading has been devised for the different anthocyanin-pigmented types and the corresponding full-green types.



3176 CHAKRAVERTI, D. N.

**A comparative study of the fibre cells in two varieties of *Corchorus olitorius* L.—A mutant jute (tall mutant) and its control (R-26).**

Sci. & Cult. 1954 : 19 : 511-12.

Compared with the original variety R26, the X-ray-induced type named Tall Mutant has greater height and basal diameter of the stem, up to 53.8% higher fibre production (weight of dry fibres from a sample of 50 plants), and finer and more lustrous fibres. Its stems and leaves are deep scarlet when mature, whereas those of R26 are light red. The mutant has 1.5 times more fibre cells than R26 (cf. Abst. 2251).

3177 BASU, R. K.

**Preliminary investigations with radioactive isotope ( $P^{32}$ ) on jute seeds.**

Sci. & Cult. 1954 : 19 : 515-16.

Exposure of dry seeds of *Corchorus olitorius* to  $P^{32}$  resulted in three pure-green forms resembling the variety Chinsura Green, and three forms with deep scarlet stems, leaves and other organs. The treated population flowered one week earlier than the control plants.

3178 KULJTIASOV, N. V.

**(Methods of establishing jute cultivation in the USSR).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 187-97. [Russian].

Examination of a large number of specimens introduced from the East showed *Corchorus capsularis* to be a more conservative species than *C. olitorius* and to be without interest as a source of breeding material for the USSR; some of the Indian forms of *C. olitorius* on the other hand produced a wide range of variation in their progeny; the different growth types observed are described in relation to their phasic development. *C. olitorius* is a short-day species adapted to self pollination and although up to 2% of cross fertilization has been observed, the great variability of the species when grown in the USSR is ascribed to shattered inheritance arising from the change of environmental conditions. By selection from one of the Indian introductions, the Central Asiatic Station of the Institute of Plant Industry produced, at the end of six years, a new variety, 420 Pervenec Uzbekistana [420 Uzbekistan First-born], characterized by red stems, 200-250 cm. high, the main stem being unbranched and 180-225 cm. high; the vegetative period is about 150 days, the yield of air-dry stems 100 c. per ha.

and over, and the fibre percentage 19.4-21.6%; its strength is equivalent to 21.4 kg., as compared with 15.6 and 11.35 kg. for two Indian varieties with which it was compared, and it is more glossy. Certain other promising selections are under observation.

3179 SANYAL, P. & DUTTA, A. N.

**Natural crossing in *Hibiscus sabdariffa*.**

Sci. & Cult. 1954 : 19 : p. 407.

Using the marker character of red nodes, the amount of natural crossing between two pure strains was found to be 0.231% at the Jute Agricultural Research Institute, Barrackpore, West Bengal.

3180 ROBINSON, B. B. & JOHNSON, F. L.

**Abaca. A cordage fiber.**

Agric. Monogr. US Dep. Agric. 1953 : No. 21 : Pp. 130. (Mimeographed).

In a detailed description of the crop, a list of more than 130 varieties grown in the Philippine Islands is given though this is stated not to be reliable as the nomenclature is confused. Characters which can be used to distinguish between varieties are mentioned. Varieties Tangoñon, Bungulanon, Maguindanao, Libuton, Sinaba and Puteean are described though only the first three are grown on a large scale. Bungulanon gives a higher yield but is less hardy than Tangoñon. Canton is described and compared with abacá.

3181 **Annual Report of the East African sisal industry for the year ended 31st December, 1952 (1953) : Pp. 148.**

*Agave amaniensis* x *A. angustifolia* F<sub>2</sub> hybrids have been planted, and of these, 11648, which is very promising, is being propagated vegetatively.

3182 PATE, J. B., JOYNER, J. F. & GANGSTAD, E. O.

**Interspecific and intervarietal hybridization in *Sansevieria*.**

J. Hered. 1954 : 45 : 69-73.

Breeding to develop fibre types for southern Florida was initiated in 1951. Of the 23 crosses attempted, *S. trifasciata* x *S. parva*, *S. trifasciata* var. *laurentii* x *S. parva*, *S. trifasciata* x *S. liberica*, *S. trifasciata* x *S. deserti*, *S. parva* x *S. deserti* and *S. trifasciata* x *S. trifasciata* var. *laurentii* were successful. The growth characteristics of *S. trifasciata* and hybrids involving this species were compared. *S. trifasciata* x *S. deserti* bore much longer leaves than *S. trifasciata*.

## SUGAR AND STARCH PLANTS

### 3183 **Annual Report of the Indian Central Sugarcane Committee for the year 1952-53 (1954) : Pp. 130.**

*Sugar Breeding Institute, Coimbatore*

N:Co. 349 from Natal and CP 290/320, CP 44/101 and F 31/436 from the USA have been used in crosses, as well as Co. 312, Co. 421, Co. 678, Co. 419 and Co. 603. The crosses CP 23/19 x Co. 356 and CP 29/103 x Co. 285 were made to obtain disease-resistant types. Studies of back-cross progeny have shown that five chromosomes of *Sclerostachya* and *Narenga* are homologous. Evidence obtained from the study of *Saccharum robustum*, Co. 602 and Kassoer indicates that parthenogenesis occurs more frequently than had been supposed. Meiotic and somatic chromosome elimination has been observed in *S. robustum*. A fertile triploid obtained from *S. spontaneum* closely resembled the Burmese form of *S. spontaneum*, suggesting that the latter may have arisen by triploidy. During the search for *S. spontaneum* variants, broad-leaved types of *S. spontaneum* subsp. *aegyptiacum* var. *nepalensis*, together with giant forms of *Narenga* and *Erianthus elephatinus* have been collected. SES 182 and 186, which are tolerant of salt and fairly resistant to red rot, have been selected for breeding work. *S. spontaneum* variants from Uganda and Ceylon have been found to constitute a previously undescribed group. Early varieties have been induced to flower later by varying the photoperiods, and the nonflowering varieties *S. spontaneum* 'Assam 301' and 'G 3011' flowered when allowed to grow for more than one season.

*Indian Agricultural Research Institute, New Delhi*

Testing varieties for resistance to *Colletotrichum falcatum* and *Ustilago scitaminea* has continued. Information on varietal trials, mill tests and tests for resistance to *C. falcatum* and sugar cane borers at stations in Uttar Pradesh and Bihar is also included.

### 3184 **Symposium on the scientific problems of the sugar industry held on 29th December 1952 at Trivandrum. Proc. Indian Acad. Sci. 1953 : Sect. B : 38 : 49-100.**

*Dutt, N. L. The breeding of sugarcane. (pp. 81-88).*

Investigations at the Sugarcane Breeding Institute, Coimbatore, Madras, are surveyed, with reference to the various aims of breeding,

cytogenetical problems, collection of *Saccharum spontaneum* types in south-east Asia and elsewhere, study of the physiology of flowering, and the scheme for surveying the manufacturing qualities of commercial Co. canes (cf. *PBA*, Vol. XXIII, Abst. 2852).

*Khanna, K. L. Varietal problem with special reference to its physiological and biochemical aspects. (p. 89).*

Attention is drawn to the need for investigating such problems as the nitrogen-yield index in relation to the breeding of sugar-cane agrotypes with less exacting demands upon the soil, and the physiology and biochemistry of the leaf tissues in relation to quality.

*Panje, R. R. An agro-botanical problem affecting the sugarcane industry in India. (pp. 90-93).*

A general discussion of the problem of the diverse response of species and types to environmental conditions is given.

*Raghavan, T. S. Some aspects of sugar-cane breeding in relation to its cytogenetical peculiarities. (pp. 94-98).*

The author emphasizes the difficulties in breeding arising from the highly complex polyploid nature of *Saccharum officinarum* and other species. Cytoplasmic inheritance (cf. *PBA*, Vol. XXI, Abst. 2866 and Vol. XXIII, Abst. 512) and parthenogenesis are discussed. It is suggested that a simplification of breeding should be attempted by synthesizing the unknown diploid progenitor of sugar cane, by eliminating all the chromosomes other than those of *Saccharum* (cf. *PBA*, Vol. XXII, Abst. 1294).

*Rafay, S. A. Pathogenicity, spread and reversion of *Physalospora tucumenensis* 'D' Rafay. (pp. 99-100).*

More virulent strains of *Ph. tucumenensis* may arise on resistant sugar-cane hosts, as shown by the appearance of strain D. On congenial hosts or chemical media, a more virulent strain may revert to an older and less virulent form, as suggested by the presumed reversion of D to A on *Saccharum spontaneum*.

### 3185 **BRETT, P. G. C.**

**The first ten years of sugar cane breeding in Natal.**

*S. Afr. Sug. J. 1954 : 38 : 309-15.*

The author surveys the techniques used in Natal to increase male and female fertility for breeding purposes, crossing methods, criteria and methods of selection, possible future trends in the commercial status of old and recently released



varieties, and varieties and seedlings at present under trial. Although release of locally produced seedlings is not expected in the near future, a large number of promising selections are being tested.

3186 STEVENSON, G. C.

**Sugar cane varieties in Barbados. An historical review.**

B.W.I. Cent. Sug. Cane Breed. Sta. 1954 : Pp. 26.

An historical survey of sugar-cane varieties and breeding in Barbados is presented, with reference to the following: the introduction and early history of the crop; the Bourbon and Cheribon canes and other importations before the twentieth century; early records of the occurrence of seedlings; the beginnings of breeding in the nineteenth century; breeding work on noble canes during the period 1900–25; nobilization; recent varietal trends in commercial planting; and the programme of inbreeding and cytogenetical research initiated in 1949.

3187 MANGELSDORF, A. J.

**Sugar cane breeding in Hawaii. Part II. 1921 to 1952.**

Hawaii. Plant. Rec. 1953 : 54 : 101–37.

A detailed and illustrated survey of breeding in Hawaii during the above period is given under the following main headings: the breeding collection; breeding procedures; germination and care of seedlings; seedling evaluation; seedling testing on the plantations; results of the breeding programme; deficiencies in this programme; and varietal performance in relation to sound practices in seed nurseries and on the farms (cf. *PBA*, Vol. XVIII, Abst. 346).

3188 WARNER, J. N.

**The evolution of a philosophy on sugar cane breeding in Hawaii.**

Hawaii. Plant. Rec. 1953 : 54 : 139–62.

With reference to experience at the experiment station of the Hawaiian Sugar Planters' Association, the author discusses the sugar cane as a subject for breeding, the introduction of parental material, choice of parents, breeding behaviour of parent canes, crossing technique, breeding procedures, the value of selfing, the "melting-pot" method of crossing, and the propagation and testing of seedlings. In his concluding remarks, he emphasizes that breeding in Hawaii is based upon an extensive approach, use being made of a diversity of parental combinations and large seedling populations, in conjunction with the rigorous discarding of mediocre material.

3189 SKINNER, J. C.

**Inheritance of the rosette character in sugar cane.**

Cane Gr. quart. Bull. 1954 : 17 : 137–40.

When self-pollinated, JB13 bred true for the rosette character which had been inherited from Kassoer through three generations of cross-breeding with POJ100, EK28 and *Sorghum durrum*. This character is present in many of the better selections and may be associated with commercially desirable features such as good stooling.

3190 **Nineteenth Annual Report of the British West Indies Central Sugar Cane Breeding Station, Barbados, for the year ending September 30th 1952 : Pp. 41.**

The results of second and third year trials of sugar cane seedlings are given, together with data on selections based on first year trials. Good results were obtained from B 4744, B 47419, B 45151 and B 46364 in high rainfall areas and from B 4738 and B 4747 in low and intermediate rainfall areas. B 47258 and B 47380 showed a high sucrose content. Lists of crosses involving *Saccharum officinarum*, *S. spontaneum*, *S. barberi*, *S. robustum*, *S. sinense* and *Erianthus arundinaceus* are given.

3191 **The sugar cane in Taiwan. Report of the Taiwan Sugar Experiment Station, 1953.**

Int. Sug. J. 1954 : 56 : p. 152.

An account of intergeneric crosses between the male-sterile seedling 36-423 and *Miscanthus japonicus* is given. All seventeen hybrids raised were morphologically similar to *M. japonicus* and had a chromosome number of  $2n = 100-114$ . It is suggested that the hybrids possess the reduced chromosome complement of 36-423 ( $2n = 127$ ), together with the unreduced chromosome complement of *M. japonicus* ( $2n = 38$ ).

The results of eleven variety trials are summarized. The most outstanding varieties were 37-435, derived from POJ2878 x Co. 356; 37-1316 and 37-1368 both from 188/12C x F108; 37-1430, from Co. 331 x F84; and 37-1483, from F121 x 341/14B.

3192 CHI, C.-C. & CHUANG-YANG, C.

**(Studies on resistance to and control of red rot of sugar cane. I. Observations on resistance to red rot in sugar cane and related plants).**

Kanche Yenchiu/J. Sugar Cane Res. 1953 : 7 : 17–36. [Chinese].

Data are recorded on the reaction of a large series of commercial canes, *Saccharum* spp. and some wide hybrids to inoculation with *Physalospora tucumanensis* in Taiwan. The most resistant forms were as follows: *S. officinarum* 'BH 10/18,' various types of *S. sinense*, *S. robustum* and *S. spontaneum*, some hybrids involving *S. narenga*, sorghum or maize, and the commercial hybrids, POJ 2883 and 2961 and PT 46-220, 46-242, 48-1, 48-29, 48-38, 48-59, 48-619, 48-630 and 48-657. Some preliminary information showing that resistance is heritable is also given.

3193 STORY, G. C.

**C.P. 29/116 in the Mackay area.**

Cane Gr. quart. Bull. 1954 : 17 : 147-49. Results of trials of CP29/116, conducted at three centres in the Mackay area of Queensland during 1948, are presented. CP29/116 produces vigorous early growth and a good stool, while the stalks compare favourably in thickness with those of Q50. A considerable degree of resistance to red rot results in the continued production of high quality sugar late into the season. This variety germinates and ratoons well on all soils of the central area.

3194 JU [CHIU], L. S.

**(An investigation of borer damage to sugar cane varieties).**

Kanche Yenchiu/J. Sugar Cane Res. 1953 : 7 : 45-61. [Chinese].

Data are provided on the percentage infestation by one or other of the principal stem-boring insects, the extent of damage by wind or typhoon subsequent to borer infestation, and damage due to rodents in a series of PT varieties grown in Taiwan. The most resistant were PT 43-52, 46-93 and 47-50.

3195 Sugarcane research in Mauritius in 1952.

Rev. agric. Maurice 1954 : 33 : 28-43.

In variety trials M 147/44, 129/43, 31/45, 24/47 and 11/43 gave the best results; the latter two varieties, together with CP36-13, have been used in breeding experiments. The Barbados varieties 3337, 34104, 37161 and 37172 have shown good ratooning qualities but are less resistant than M134/32 to *Clemora smithi*. M147/44 appears to be resistant to borers. Varieties recently introduced into Mauritius include Eros, H32-8560 and H37-1933 from the USA and R336, R397, B41227, POJ3016, Pindar and Trojan from Réunion.

3196 COSTA, A. S., AGUIRRE JÚNIOR, J. M. DE, SEGALLA, A. L. & ALVAREZ, R.  
Resistência ao mosaico dos "seedlings" de cana de açúcar obtidos em 1950. (Mosaic resistance of sugar cane seedlings obtained in 1950).

Bragantia 1952 : 12 : 285-90.

Application of inoculum by friction with carborundum proved more effective than piercing the leaf with a needle; the inoculum itself was obtained from infected maize plants grown in the greenhouse. Over 20,000 seedlings were tested in 1950; crosses of CP varieties showed the highest proportions of resistant offspring.

3197 HASKEW, H. C.

**Variety trials—1953 season.**

Cane Gr. quart. Bull. 1954 : 17 : 124-36.

Results of varietal trials of sugar cane conducted at 19 centres in Queensland are presented. Pindar and H45 gave good yields in several of these trials.

3198 SEDLMAYR, K.

**(Preliminary report on vegetative beet hybrids).**

Acta agron. 1952 : 2 : 99-106. [Russian].

The progeny of sugar beet grafted on to mangel and of mangel on to sugar beet are reported to have displayed characters intermediate between those of stock and scion parents in experiments conducted at Sopronhorpács, Hungary.

3199 MANDOLESI, M.

**Il seme poliploide di barbabietola zuccherina. (Polyploid seed of sugar beet).**

Ital. agric. 1954 : 91 : 355-64.

The general characteristics of polyploid beets are described and figures are presented which show that the Danish polyploid Maribo-P gave a higher yield of roots than any diploid when grown in Italy, the differences being significant except in the case of the varieties Alba, Buszczysński and Crevalcore; the polyploid also gave a higher yield of sucrose per ha. and a lower coefficient of variation for root weight.

3200 KATO, K. & HOSOKAWA, S.

**(On the special conditions required for artificial germination of sugar beet pollen).**

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 298-99. [Japanese].

A strong stimulating effect on pollen germination in artificial media following the addition of low concentrations of boric acid is reported.



3201 ORLOVSKIĬ, N. I.

(**The effect of climatic conditions upon the yield and sugar content of the following generation of sugar beet**).

Agrobiologija (Agrobiology) 1954 : No. 1 : 68-72. [Russian].

Variability in yield and quality of the seed of the varieties M6, which has a high sugar content, and I 1305, when grown for a season under varied climatic and soil conditions, is described. The changes involved appreciable differences in root yields and sugar contents in the succeeding generation.

3202 **Resists leaf spot.**

What's New Crops Soils 1954 : 6 : No. 7 : p. 23.

The new sugar-beet inbred US 201 is highly resistant to *Cercospora* leaf spot.

3203 FUKUSHI, T., SHIKATA, E. & YOSHITANI, K. (**On sugar-beet mosaic**).

Hokkaido Daigaku Nogakubu Hobun Kiyo/Mem. Fac. Agric. Hokkaido Univ. 1953 : 1 : 443-54. [Japanese].

Mosaic has appeared in several localities in Hokkaido; data are provided on the degree of infection of a series of Japanese and introduced varieties and lines.

3204 WAUTHY, R. & ROUSSEL, N.

Les résultats des essais de variétés de betterave sucrière en Belgique de 1948 à 1953. (**The results of variety trials of sugar beet in Belgium, 1948 to 1953**).

Publ. Inst. belge Amélior. Better. 1953 : 21 : 109-21.

Tabulated data on the results of trials conducted at five centres in Belgium are presented. Over the period 1948-53, Kleinwanzleben E, Glostrup N and Zwaanesse II gave the highest yields of sugar per hectare; Desprez Z, Maribo N, Eagle Hill N and Kuhn P had the highest sugar contents; and Kleinwanzleben E proved most resistant to bolting.

3205 RAPIN, J.

La culture de la betterave à sucre en altitude. (**The cultivation of sugar beet at high altitudes**).

Rev. rom. Agric. 1954 : 10 : 11-12.

Several varieties were tested at different localities and at varying altitudes by the Agricultural Experiment Station, Lausanne, Switzerland. Kuhn P appears to have given the most consistently satisfactory yields of sugar and had also a high sugar content per given weight of root.

3206 ADRIAENS, E. L. & HESTERMANS-MEDARD, O.

Remarques à propos de la composition chimique du manioc roui, non roui ou cuit à l'eau. (**Observations on the chemical composition of retted and non-retted cassava, and on cassava cooked in water**).

Bull. agric. Congo belge 1954 : 45 : 1-24.

Particulars of variations in chemical composition of cassava varieties cultivated in the Belgian Congo are included.

3207 VOISIN, J.-C.

Teneurs en acide cyanhydrique des maniocs de Côte d'Ivoire. (**The hydrocyanic acid contents of the cassavas of the Ivory Coast**).

Rev. gén. Bot. 1954 : 61 : 386-88.

The hydrocyanic acid content of 16 varieties was determined at the Institute for Tropical Research, Adiopodoumé. The HCN content of sweet cassava varied from 5.5 mg. per 100 g. of fresh root in the variety Guebi to 9.1 mg. in Tabouca. Of the bitter varieties, Agba Koumasi contained 25.6 mg. per 100 g. and Agba Kokoia 36.2 mg.

## STIMULANTS

3208 VASILJEV, A. F.

(**Changes in the regional distribution of varieties of tobacco and *Nicotiana rustica***).

Tabak (Tobacco) 1954 : No. 2 : 55-57. [Russian].

Two new tobacco varieties have been distributed for cultivation in the USSR; Suhumi 959 is a hybrid from Samsun 1857 x Samsun 27 and has yielded 17.7 c. per ha., which is 2.3 c. per ha. more than Samsun 27, the variety previously recommended for the Abkhazian ASSR; it is equal to Samsun 27 in quality. Trapezond 161 is a complex hybrid produced at Alma-Ata; it yields 27 c. per ha. and is resistant to mildew and mosaic.

Trapezond 10/7, a selection from 1605/333 x Trapezond 1867 x Trapezond 1867, is gaining in popularity; it outyields Trapezond 1268 and is fairly resistant to mosaic and mottling. The cigar tobacco Perevolocanec, from American Devickii x Hungarian 1782, is earlier than other cigar types and less prone to tip chlorosis, though in yield it is not quite equal to some of the other varieties.

The variety Vysokoroslaja Zelenaja [Tall Green] of *N. rustica* has been distributed for the first time and with a yield of 58.9 c. per ha. has

given 4-7 c. per ha. more than the previously recommended variety Voronež 2; it is more resistant to bacterial spot and scorching, and equal or superior to it in quality.

- 3209 TAKENAKA, Y.  
(Cytogenetical studies of *Nicotiana* III. Reduction division in  $F_1$  hybrids between *N. glauca* and the *alata* group).

Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 155-62. [Japanese].

Three sterile hybrids, *N. glauca* x *N. alata*, *N. glauca* x *N. plumbaginifolia* and *N. longiflora* x *N. glauca*, were obtained and studied cytologically. In the first hybrid, 0-7 bivalents were formed, with the mode at 3-4<sub>II</sub>; in the second, 0-4 bivalents were observed, the modal value being 2<sub>II</sub>. A high incidence of polyvalent formation characterized the last cross, all associations up to octovalents being observed.

- 3210 HASLAM, R. J.  
Problems arising from use of new tobacco varieties.

Lighter 1954 : 24 : No. 1 : 11-16.

The development of new varieties in Canada from crosses involving wild *Nicotiana* species has brought about changes in the adaptability to environment, cultural practices and the qualities and chemical properties of the cured leaf. The problems arising from these changes are discussed.

- 3211 Enstitülerimizin 1949 ve 1950 çalışmaları.  
(Annual Report on Tobacco 1949 and 1950).

Tekel Inst. Raporl. 1951 : 6 : Pp. 23.

Selection and trial of the chief local tobaccos continued. Experiments on local varieties were carried out at several stations to determine the influence of fertilizers on nicotine content, yield and quality. At the Buca Breeding Station, tests of disease-resistant varieties received from the Bornova Pest & Disease Control Station are in progress.

- 3212 TAKENAKA, Y.  
(Cytogenetical studies of *Nicotiana*. II. Reduction division in 12 wild species and 3 cultivated varieties).  
Senshokutai (Chromosome)/Kromosomo 1953 : No. 16 : 596-601. [Japanese].

Meiosis is described in *N. alata*, *N. bigelovii*, *N. gossei*, *N. longiflora*, *N. noctiflora*, *N. nudicaulis*, *N. paniculata*, *N. rotundifolia*, *N. rustica*, *N. suaveolens*, *N. tabacum*, *N. tomentosiformis*, *N. trigonophylla* and *N. undulata*. In all species, meiosis was regular, except in *N. nudicaulis* where some multiple associations were noted.

- 3213 MURAOKA, Y. & TOKITSU, T.  
(Studies on abnormal bud initiation in tobacco. III. Varietal differences in abnormal bud initiation and development under field conditions).  
Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 304-05. [Japanese].

A comparative study of seven American varieties grown under Japanese conditions showed that marked varietal differences occurred in the date of flower-bud initiation and less marked differences in the date of flowering when the varieties were planted early. After late planting, these differences were hardly apparent.

- 3214 STEPHEN, R. C.  
Research into diseases of tobacco.  
Rhod. Tob. 1954 : No. 4 : 26-27.

M 46 Vamorr 50 has shown the most resistance to mosaic in Southern Rhodesia. Breeding for resistance to white mould in commercial varieties has been undertaken.

- 3215 New tobaccos for Tennessee.  
What's New Crops Soils 1954 : 6 : No. 8 : p. 28.

The tobaccos Burley 11A and Burley 11B, resistant to both blackshank and root rot, are the result of cooperative work between the US Department of Agriculture and the Tennessee and Virginia Agricultural Experiment Stations. Burley 11A produces a slightly thinner leaf than Burley 11B.

- 3216 ALCARAZ-MIRA, E.  
Tobacco mosaic resistance in Spain.  
Science 1954 : 119 : p. 296.

The mosaic-resistant segregate 60 (Ambalema x a Philippine cigar tobacco) was crossed with several commercial types at the Tobacco Institute, Seville. Valuable selections have been developed from the back cross of segregate 60 to the Philippine parent and from crosses with Cantabria, Macrophylla and Mammoth Havana. All these selections develop only very mild symptoms of mosaic and are regarded as equal to Ambalema in resistance. Using these strains, the production of commercial forms is envisaged.

- 3217 BOLTON, A.  
Progress report on breeding for mosaic resistance.  
Rhod. Tob. 1954 : No. 4 : p. 32.

Ambalema and *Nicotiana glutinosa* have been used in Southern Rhodesia for breeding mosaic-resistant lines. Only the line M6E, derived from *N. glutinosa*, has proved worthy of further investigation. Crosses to combine the yield and resistance of Vamorr 50 with the quality of Delcrest are being made.



## 3218 GUINARD, A.

La culture du thé en Indochine. (**The cultivation of tea in Indo-China**). Arch. Rech. agron. pastor. Viêt-Nam 1953 : No. 20 : Pp. 179.

This survey includes data on the morphological characters of the principal varieties cultivated in Indo-China and an account of breeding work carried out at the Agronomic Experiment Station, Blao. Pedigree selection followed by vegetative propagation of the more suitable mother trees has given better results than mass selection or hybridization.

## 3219 WIGHT, W. &amp; BARUA, P. K.

**Morphological basis of quality in tea.**

Nature 1954 : 173 : 630-31.

In breeding at the Tocklai Experimental Station, Assam, pubescence of the lower epidermis of the fresh leaf has proved to be genetically determined and closely associated with quality. It has further been discovered that red anthocyanin pigment of the petiole, also genetically conditioned, is associated with good quality, but only when a low amount is present.

## 3220 PORTSMOUTH, G. B.

**The improvement of Ceylon tea.**

World Crops 1954 : 6 : 203-05.

Vegetative propagation of high-yielding good-quality tea plants in the mixed plantations of Ceylon to replace inferior bushes is advocated. Selection for blister-blight resistance and tolerance of *Pratylenchus pratensis* is discussed. From the time of uprooting to bringing the new plants into bearing would take four years.

## 3221 BERTRAND, G. &amp; BERTRAND, D.

Sur la teneur en rubidium des cafés. (**On the rubidium content of coffees**). CR Acad. Sci., Paris 1954 : 238 : 1684-85.

The rubidium content of different species of various provenance is given.

## 3222 FOUCART, G.

Un nouvel ennemi du caféier d'Arabie au Kivu, *Habrochila placida* (Note préliminaire). [**A new enemy of *Coffea arabica* in Kivu, *H. placida*. (Preliminary note)**]. Bull. INEAC 1954 : 3 : 51-62.

The appearance of *H. placida* in the Kivu Province, Belgian Congo, has led to serious losses in the coffee plantations. The varieties Mibiriza, Local Bronze, Indata and Jackson have proved least susceptible to attack.

## 3223 A report on cacao research 1952.

Imp. Coll. Trop. Agric., Trin. 1953 : Pp. 71.

Cope, F. W. *Plant breeding. A progress report.* (pp. 6-7).

Progenies of crosses among ICS clones and of crosses between ICS clones and the witches' broom resistant clones SCA 6 and SCA 12 have been planted at River Estate. Hybridization between  $S_1$  progenies was initiated. Crosses between widely different types are being studied, using the Trinitario cacao ICS 1, the Amazonian Forastero type M 8 and the Criollo cacao ICS 45 as parents. The "crinkle dwarf" type M 253 has also been employed in crosses with ICS 1 and M 8. Vigorous seedlings were obtained from crosses of *Theobroma grandiflora* with ICS 45 and ICS 95. Seedlings from *Th. cacao* x *Th. subincana* and *Th. cacao* x *Th. angustifolia* were poor in vigour. The inheritance of such characters as axil spot, crinkled dwarf and cotyledon colour is under investigation. Study of the inheritance and mechanism of self incompatibility continued. Examination of microtome sections of ovaries fixed at 72 hours after pollination gives information on incompatibility.

Considerable progress was made in establishing the collection of cultivated varieties and wild species.

Baker, R. E. D. *Anglo-Colombian cacao-collecting expedition.* (pp. 8-10).

In the first part of the above expedition (cf. PBA, Vol. XXIII, Abst. 559 and Vol. XXIV, Abst. 546) attention was concentrated on the upper tributaries of the Amazon in the provinces of Vaupés and Amazonas. Seven species of *Theobroma* and three of *Herrania* were found. Notes are given on the distribution of the collections, together with information on pod and bean characteristics, native uses and incidence of witches' broom. All the specimens of *Th. cacao* were of the same type, viz. a yellow-podded Amazonian Forastero of the Amelonado type, with poor pods, purple beans and a high degree of susceptibility to witches' broom; freedom from this disease in certain areas was probably due not to resistance but to the fact that the causal fungus had not yet reached those districts. The significance of native names for *Theobroma* and *Herrania* species is briefly discussed; none of the native tribes encountered had any name for *Th. cacao* other than cacao, suggesting that this species is an introduction.

- 3224 CUATRECASAS, J.  
Une nouvelle espèce de *Theobroma*. (A new species of *Theobroma*).  
Rev. Bot. appl. 1953 : 33 : 562-65.

*Th. gileri*, found in the forest of Esmeraldas, western Ecuador, is described. It has been assigned to the section *Telmatocarpus* and is similar to *Th. microcarpum*, differing from the latter species in its larger and more elliptic fruit, pubescent sepals and penninervate leaves.

- 3225 HOLLIDAY, P.  
The cultivated cacao of Colombia.  
J. agric. Soc. Trin. Tobago 1953 : 53 : 397-406.

The author surveys the cultivated cacao types found in the different regions of Colombia during the recent expedition to that country; he also discusses the observed distribution of witches' broom and *Monilia* pod rot (cf. Abst. 3223). Material from seed of Criollo and near-Criollo types from Colombia has been established in Trinidad; a few of the selected clones developed at the Palmira Station have also been introduced.

- 3226 GRONDONA, E. M.  
Historia de la yerba mate. (History of maté).  
Rev. argent. Agron. 1953 : 20 : 68-95;  
1954 : 21 : 9-24.

A somewhat detailed account is given of maté in South America from the middle of the sixteenth century and the species *Ilex paraguariensis* is described; it is pointed out that many botanical varieties established in the past merely represent variants in a series and would have been recognized as such had more adequate material been available; var. *sincorensis* is however regarded as possibly representing a distinct species. In chromosome counts in pollen mother cells the majority had 20 bivalents but occasional cells had  $19_{II} + 2_I$  and  $18_{II} + 1_{IV}$ ; 92% of the pollen stained well in cotton blue.

- 3227 SALMON, E. S.  
"Copper Hop", a new variety.  
Wye College 1954 : Pp. 4.

Developed at Wye College, Kent, England, the variety Copper Hop (OK40) has the favourable characters of being easy to grow and pick, good yielding capacity, a high degree of resistance to downy and powdery mildew, Fuggle-like aroma and an exceptionally high preservative value. It is susceptible to *Verticillium* wilt and is believed to be a carrier of mosaic virus. On the maternal side, its ultimate ancestor was a plant (F19) of Oregon Cluster, from which it has

directly descended by way of three hybrid seedlings of unknown ♂ parentage, viz. M45, OP13 and RI/94a.

## MINOR CROP PLANTS

- 3228 SHARMA, A. K. & GHOSH, C.  
Cytogenetics of some of the Indian umbellifers.  
Genetica 1954 : 27 : 17-44.

Cytological studies were carried out on *Carum roxburghianum* ( $2n = 21$ ), *Carum copticum* ( $2n = 18$ ), *Coriandrum sativum* ( $2n = 22$ ), *Cuminum cyminum* ( $2n = 14$ ), *Foeniculum vulgare* ( $2n = 22$ ), *Peucedanum sowa* ( $2n = 22$ ), *Daucus carota* ( $2n = 18$ ), the ornamental species *Ammi majus* ( $n = 11$ ) and the noneconomic species *Hydrocotyle asiatica* ( $2n = 18$ ) and *Oenanthe benghalensis* ( $2n = 20$ ). The different species were characterized by distinctive caryotypes, particularly with respect to the nucleolar chromosomes. It is suggested that evolution within the Umbelliferae was initiated by different structural changes in the chromosomes; in view of the normal cytological behaviour of the representative types studied, it is concluded that such ancestral structural modifications have now reached a homozygous condition.

- 3229 PORTÈRES, R.  
Le potentiel de variation clonale de *Vanilla tahitensis* J. W. Moore. (The potential of clonal variation in *V. tahitensis* J. W. Moore).  
Agron. trop., Nogent 1953 : 8 : 639-40.

A somatic mutant of *V. tahitensis*, designated var. *tihita*, is described. Its morphological characters lend support to the hypothesis of a hybrid origin of *V. tahitensis* from the cross *V. fragrans* x (*V. pompona* x *V. odorata*).

- 3230 ROSENTHAL, C.  
Untersuchungen zur Sortendiagnostik von Estragon. (Investigations of varietal diagnosis in tarragon).  
Züchter 1954 : 24 : 40-47.

Morphological and anatomical characters by which German tarragon may be distinguished from Russian tarragon are described. It is suggested that the sterility of the former variety may be due to it being a hybrid. Experiments aimed at doubling the chromosome number are advocated, with a view to facilitating propagation and crossing the resulting polyploid with the Russian form in order to combine the superior oil quality of German tarragon with the higher yield, more vigorous growth and rust resistance of Russian tarragon.



- 3231 MAUGINI, E.  
Ricerche cito-embriologiche su *Piper medium* Jacq. var. *ceanothifolium* (H.B.K.) Trel. et Yun. [Cytoembryological researches on *P. maximum* Jacq. var. *ceanothifolium* (H.B.K.) Trel. et Yun.].

Caryologia 1953 : 5 : 282-87.

Studies of the female gametophyte have shown that  $n = 14$  and that development is of the type found in *Euphorbia dulcis*, the chalazal nuclei being triploid. Microsporogenesis was quite normal.

- 3232 **Additional studies are made on the origin and evolution of peppers.**

Inform. Bull. Inter-Amer. Inst. agric.

Sci. 1954 : Nos. 63-65 : p. 2.

A brief account is given of work recently carried out at the Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica, by C. B. Heiser (Jun.) on the origin and evolution of *Capsicum* spp. (cf. Abst. 1356). The exact origin of the individual species has not yet been determined; possibly *C. pubescens* and *C. pendulum* originated in the Andes and *C. annuum* in Central America.

- 3233 MINKEVIČ, I. A.

(High-yielding varieties of oil plants).

Nauka i Žiznj [Science & Life], Moscow 1953 : No. 7 : 21-23. [Russian].

**Linseed.** Crimea 250 and Kirovograd 7, new dual-purpose varieties with a high oil content, have been developed.

**Sunflower.** Standards recently released include Zelenka 368 [Green 368], VNIIMK 8931 [Institute of Oil Plants 8931] and Armavir 3497, which are notable for their high oil content, and VNIIMK 8883 and VNIIMK 8932, valuable for their earliness.

- 3234 ANDERSSON, G.

Aktuella synpunkter på våroljeväxter av Svalöfssorter. (Current views concerning Svalöf varieties of spring oil crops).

Allmänna Svenska Utsädesaktiebolaget, Svalöf 1954 : 25-29.

White mustard, spring rape, linseed, *Camelina* and poppy are discussed from the standpoint of their present acreage and prospects in Swedish farming. In addition to descriptions of the varieties of the above mentioned crops (cf. Absts. 2339 and 2348), mention is made of the high-yielding Svalöf poppy, Flora, which has not only surpassed Mahndorfer by 9% in yield of seed and 10% in oil production, but also matures earlier and, as a result of being less

prone to breakage of the straw, is more easily harvested. For Skåne, the corresponding yield figures were 12 and 15% respectively.

Further comparative trials of Svalöf *Camelina* (Sv0700) and the Finnish variety Vaanila have shown that the former has smaller seeds and ripens earlier than the latter, which it also surpasses in seed yield and oil content.

- 3235 SINGH, D.

**Bloomless mutant in *Brassica campestris* var. *sarson*.**

Sci. & Cult. 1954 : 19 : p. 454.

The glaucous stem of a mutant of *sarson*, studied at the Government Research Farm, Kanpur, Uttar Pradesh, depends upon a single pair of recessive genes. This bloomless character is expected to be useful as a marker in determining the extent of natural crossing. Bloomless mutants of *B. campestris* var. *toria* and *B. juncea* have also been found.

- 3236 SOUSA, O. F. DE & CANECCHIO FILHO, V.

Melhoramento da mamoneira. VII. Quarta, quinta, sexta e sétima séries de ensaios de linhagens. (Improvement of the castor-oil plant. VII. Fourth, fifth, sixth and seventh series of tests of lines).

Bragantia 1952 : 12 : 301-07.

Further observations (cf. *PBA*, Vol. XVII, Absts. 804-6) on lines selected from two dwarf varieties, 14 and 38, were made in 1943-51 in different localities in the state of São Paulo, Brazil. Yields exceeding that of variety 38 were given by lines 881, 882 and 883 at Ribeirão Preto on red soil and by 168 and 881 at Pindorama on sandy soil. At the other places none of the selections was significantly better than 38.

- 3237 ZIMMERMAN, L. H. & PARKEY, W.

**Pistillate  $F_1$  castorbeans: their possible significance in producing commercial hybrid seed.**

Agron. J. 1954 : 46 : p. 287.

The line Nebraska 145-4, in which the pistillate character is pronounced (cf. *PBA*, Vol. XX, Abst. 1829), is being used as a ♀ parent in producing  $F_1$  single-cross seed for commercial purposes in the United States. Roguing of normal monocious plants has to be carried out several times prior to pollen shedding, to keep sib pollination at the minimum.  $F_1$  hybrids consisting of only pistillate individuals are obtained from crosses of pistillate plants of Nebraska 145-4 with Brazilian 330, a normal monocious type, or USDA 49, having racemes with ♂ and ♀ flowers interspersed. It is

suggested that such pistillate  $F_1$  hybrids could be used in three-way crosses with pollen-producing lines having good combining ability, so that roguing would not be necessary in the production of the commercial hybrid seed.

- 3238 PARKEY, W. & SCHOENLEBER, L. G.  
**A new device, mechanical nomograph, for measuring the sex expression in castor beans, *Ricinus communis*.**

Agron. J. 1954 : 46 : 288-89.

A mechanical device for determining the relative percentages of the ♂ and ♀ portions in the normal monocious raceme is described; the instrument makes possible the accurate classification of large populations in investigations of the inheritance of sex expression.

- 3239 CHOUARD, P.  
Conditions et facteurs nouveaux de la culture du ricin. (**Conditions and new factors in the cultivation of the castor oil plant**).

Oléagineux 1954 : 9 : 239-43.

This survey of world cultivation of the castor oil plant includes a brief note on varieties. Anjou, Baker 1, Blackwell, Cimarron and Conner are early varieties suitable for cultivation in temperate regions with a high rainfall.

- 3240 GVOZDEVA, Z. V.  
[**Characteristics of the castor oil plant (*R. communis* L.) as regards dehiscence of the capsules**].

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 208-13. [Russian].

The anatomy of the castor oil capsule is examined; the degree to which the capsules tend to dehisce was found to be related to the thickening of the pericarp at the keel of the locules; those capsules in which the degree of thickening was least showed the least tendency to dehiscence. A rope-like thickening at the zone of fusion of the locules was also correlated with low dehiscence.

All forms of *R. macrocarpus* have a low tendency to dehiscence, though the degree varies with the variety; those of var. *sanguineus* commonly grown in the USSR are only relatively free from the defect, whereas the Indian, Japanese and Chinese forms are almost entirely free.

- 3241 Forsøg med sorter af olieør 1949-1952. (**Trials with varieties of linseed, 1949-52**).

Tidsskr. Planteavl 1954 : 57 : 366-68.

Comparative trials of the same five varieties already tested in 1949-53 (cf. *PBA*, Vol. XXII,

Abst. 2168) were continued in 1949-52 with 3 additional varieties, Øtøfte L.12, the Argentine linseed Langelands B.L. and Svalöf 01052. Yields per ha. of seed, straw and crude oil are tabulated. *Trifolium Rekord* [*Trifolium Rekord*] gave the highest yield of seed and the second highest yield of crude oil, but a low yield of straw.

- 3242 STAM, J. A. M.  
(**Some questions concerning the resistance of linseeds to *Fusarium***).  
Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 2 : 138-48. [Russian].

Tests were carried out in plots artificially infected with *F. lini*. In every group (cf. Abst. 3168) the majority of the forms proved susceptible, but some groups contained a higher proportion of resistant forms than the average, e.g. the intermediate group of the central zones of the Black Sea area, of which two varieties receive special mention, K-649 from the Voronež province and K-862 from Penza. Other forms mentioned for their resistance are the Georgian hill flax 5265, the Kashgar group of Chinese flaxes, particularly K-2395, and India 3005, from northern India, which is moderately resistant to both *F. lini* and *Colletotrichum lini*. Some breeders' varieties proved resistant, e.g. Pobeditelj [Victor] and Stahanovec [Stahanovite] among the fibre types, but certain varieties introduced from the USA as resistant forms, such as Wilt Resistant N and Winona, proved susceptible when grown in the USSR. None of the breeders' varieties of linseed was resistant, the partial resistance of Stepnoi 265 [Steppe 265] from Voronež being the highest degree found; the variety Ruban 18, from Jaroslav 4209 x Egypt 265, is considerably more resistant but has not been certified on account of its lower yielding capacity. This hybrid is more resistant than either of its parents and points to the possibility of breeding resistant forms by selection among hybrids even between only partially or even nonresistant parents; promising resistant selections have already been made from several crosses, including: K-4098 (resistant) x Kuban 22 (susceptible), Krupnosemjannyi 3 [Large-seeded 3] (susceptible) x Egyptian K-265 (resistance above average) and Argentine K-4249 x K-4098 (both highly resistant).

The results of the tests on infected soil were found to conform closely to the behaviour of the varieties when grown under ordinary agricultural conditions.



3243 NAKAJIMA, G.

**(Chromosomes of *Stachys sieboldii* and purple perilla).**

Senshokutai (Chromosome)/Kromosomo 1953 : No. 16 : 605-06. [Japanese].

Studies of the root tips of *S. sieboldii* revealed  $2n = 69-70$  chromosomes; an investigation of meiosis in purple perilla showed that  $n = 20$ .

3244 SAMOHINA, Z. F.

**(Sunflower breeding).**

Zemledelie (Agriculture) 1954 : No. 2 : 99-102. [Russian].

New forms of sunflower suitable for cultivation in the Nonblack-Earth Belt and interesting for their high yield, earliness and good quality seed have been obtained by continuous selection from Saratovskii Ranni [Early Saratov] and Irkutsk. These varieties were grown with other varieties of the northern and central Russian ecotypes to facilitate open pollination.

3245 **New sunflower resists rust.**

What's New Crops Soils 1954 : 6 : No. 7 : p. 29.

A new variety, Synthetic 1, which is being tested at the Morden Experimental Station, Man., has given high yields and is resistant to rust.

3246 CLAASSEN, C. E.

**Inheritance of sterility, flower color, spinelessness, attached pappus and rust resistance in safflower, *Carthamus tinctorius*.**

Res. Bull. Univ. Neb. agric. Exp. Sta. 1952 : No. 171 : Pp. 28.

Two types of sterility were studied: (1) complete or almost complete failure to set seed by plants bearing a normal number of flowering heads and florets, and (2) the production of a single terminal head devoid of florets. Both types were inherited as single recessive characters.

Four factors, *O*, *Y*, *C* and *R*, are postulated to explain the inheritance of flower colour. *Y* and *C* are basic genes for red, orange and yellow; with *Y* as the only dominant or with *Y* in any combination including *O* and *R*, either singly or together, light-yellow flowers are obtained; *C* or *c* plus *O* and *R* in the recessive or dominant condition and *Y* determines the production of white flowers. Red, orange and yellow flowers are associated with genotypes containing (1) *Y* and *C*, (2) *Y*, *C* and *R* and (3) *O*, *Y* and *C* or *O*, *Y*, *C* and *R*, respectively. The factor *O* is epistatic to *R*.

Spinelessness was dominant over spinelessness in all crosses. In one cross ( $N-1 \times N-8$ ), spinelessness was conditioned by a single factor only; in the

other crosses modifiers affected the degree of spininess, a finding of importance to breeding. The use of a spine index, calculated by multiplying the number of spines on both sides of an outer involucre bract by the average length in millimetres, was found to be highly satisfactory in inheritance studies.

Attached pappus was dominant over unattached and depended upon a single major factor with intermediate dominance and upon modifiers.

Resistance to rust (*Puccinia carthami*) under Nebraska conditions was partially or completely dominant in all crosses. The resistance of  $N-804$ , an introduction from Turkey, depended upon a single dominant factor.

3247 DEVUYST, A.

**Selection of the oil palm (*Elaeis guineensis*) in Africa.**

Trop. Agriculture, Trin. 1954 : 31 : 133-48.

The author gives a detailed account of the investigations underlying his conclusion that under uniform conditions selection for bunch weight can be based on plant height at the age of one year (cf. Abst. 1373).

3248 FUCHS DE KRAPOVICKAS, A. M.

**Complemento cromosómico de especies austroamericanas de "*Ephedra*" (Gnetáceas). [Chromosome complement of South-American species of *Ephedra* (Gnetaceae)].**

Rev. argent. Agron. 1954 : 21 : 43-45.

The basic number 7 for the genus is confirmed. In *E. breana* the number  $2n = 28$  was found, in contrast to  $2n = 14$  as reported by Hunziker for another specimen of this species (cf. Abst. 1375). In *E. frustillata*, *E. multiflora*, *E. ochreatea*, *E. rupestris*, *E. triandra* and *E. tweediana*,  $2n = 14$ .

3249 KATAYAMA, T.

**(On sterility in *Cassia tora* induced by the atomic bomb. II. Crossing experiments involving asynaptic plants and the inheritance of this condition).**

Kyushu Diagaku Nogakubu Gakugei Zasshi/Sci. Bull. Fac. Agric. Kyushu Univ. 1953 : 14 : 195-204. [Japanese].

An asynaptic strain of *C. tora* obtained at Nagasaki following the 1945 atomic explosion was shown to be pollen sterile but partially fertile when pollinated by normal plants. A 3:1 ratio of normal:asynaptic plants was obtained in the  $F_2$ , indicating that asynapsis depended on a single recessive gene.

- 3250 KATAYAMA, T.  
(On sterility in *Cassia tora* induced by the atomic bomb. III. Cytological observations on the asynaptic plants). Kyushu Daigaku Nogakubu Gakugei Zasshi/Sci. Bull. Fac. Agric. Kyushu Univ. 1953 : 14 : 205-15. [Japanese].

A detailed description of meiosis in the asynaptic plants referred to in Abst. 3249 is presented.

- 3251 KATAYAMA, T.  
(Studies on polyploidy. I. On artificial polyploidy in *Cassia tora* L.).

Kyushu Daigaku Nogakubu Gakugei Zasshi/Sci. Bull. Fac. Agric. Kyushu Univ. 1953 : 14 : 217-26. [Japanese].

Autotetraploid plants were obtained by colchicine treatment, showed the usual gigas characters, and bloomed later and set fewer seeds than the parental diploids.

- 3252 KATAYAMA, T.  
(Studies on polyploidy. II. On artificial polyploidy in *Cassia occidentalis* L.).

Kyushu Daigaku Nogakubu Gakugei Zasshi/Sci. Bull. Fac. Agric. Kyushu Univ. 1953 : 14 : 226-34. [Japanese].

Tetraploid plants were obtained by colchicine treatment. They showed the usual gigas characters and fertility was comparatively good.

- 3253 TOLLENAAR, D.  
*Dothidella ulei* en de rubber cultuur op het westelijk halfmond en in Z.O.-Azië. (D. *ulei* and rubber cultivation in the western hemisphere and in S.E. Asia).

Bergcultures 1954 : 23 : 55-61; 93-103.

The difficulties involved in establishing a rubber growing industry in South America are discussed and the present advantages enjoyed by Asiatic countries in low labour costs, rubber growing experience and freedom from *D. ulei* indicated. Breeding in South America for resistance to *D. ulei* is described briefly; some resistant clones have been obtained which, although they are inferior in yield to Asian clones, may be used to top-bud the latter to combine high yield with disease resistance. In view of the possibility of the disease spreading to South East Asia, it is suggested that the rubber-growing Asiatic countries should exchange their *Hemileia* resistant coffee clones for *Dothidella* resistant rubber clones from South America.

- 3254 LANGFORD, M. H.  
*Hevea diseases of the Amazon Valley*. Bol. téc. Inst. agron. Norte 1953 : No. 27 : Pp. 28.

This survey of investigations carried out at the Instituto Agrônômico do Norte, Brazil, on the major diseases of rubber and their control, refers to breeding for resistance to leaf blight (*Dothidella ulei*). Over 7000 resistant progenies derived from crosses between high-yielding Oriental clones and blight-resistant selections of different species of *Hevea* are under test for yield. Use of resistant or tolerant top-budding clones is recommended as the best means of controlling a number of other diseases.

- 3255 Work with rubber plants may give means for better use of submarginal lands.

What's New Crops Soils 1954 : 6 : No. 7 : p. 23.

Useful breeding material has been obtained from Mexico in the form of two guayule strains. These had higher rubber contents than standard varieties when grown in Texas.

- 3256 TOXOPEUS, H. J.  
De waarde van het onderzoek naar de vormenrijkdom voor de veredeling van pharmaceutische en aromatische gewassen. (The value of the examination of variability for the breeding of medicinal and aromatic plants). Pharm. Weekbl. 1952 : 87 : 631-36.

The distribution and ecological variability of wild and cultivated forms of *Derris elliptica* and *Syzygium aromaticum* in Malaya are described and the possibility of increasing the genetic variability of the cultivated varieties by hybridization with wild forms is examined (cf. *PBA*, Vol. XXIII, Abst. 1776).

## FRUITS AND NUTS

- 3257 Les activités agronomiques de la Station de Keyberg. (The agronomic activities of the Keyberg Station). Bull. INEAC 1954 : 3 : 81-109.

The part played by the Keyberg Experiment Station in testing new species and varieties introduced into the southern Belgian Congo is described. In addition to the crops listed below, the results of trials of maize, *Pennisetum purpureum*, lucerne, clover, potato, sweet potato and French beans are given.

**Apple.** Of 94 varieties introduced from South Africa, Europe and America, only Rome Beauty has proved suitable for cultivation in this part of the Belgian Congo.



**Peach.** The varieties Killie Krankie, Alexandre Jewell, Nell and Early Mammoth have given reasonably high yields of good quality fruit.

**Strawberry.** Général Leclerc and Capron have proved the most suitable varieties for cultivation in this area.

**Melon.** Noir des Carmes Idéal, Cantaloup Prescott, Cantaloup Noir des Carmes, Noir des Carmes d'Anvers, Charentais and Honey Rock have given good yields under local conditions.

3258 GRANHALL, I.

Aktuellt från Amerikansk och Svensk växtförädling med frukt. (**Current news concerning American and Swedish fruit breeding**).

Sverig. pomol. Foren. Årsskr. 1953: 98-109.

In 1952 the writer made a study of fruit breeding and relevant genetical research in Canada and the USA, where much attention is given to hybridization and selection of stone fruits, to apple scab resistance, polyploidy and the induction of mutations.

A report is also given on work in progress at the Balsgård Institute in Sweden on the breeding of pome and stone fruits and of hazels (cf. Abst. 2361). Research is also in progress there on frost resistance in cherries, pears and apples and on the breeding of scab-resistant apples (cf. Abst. 3283).

3259 GEORLETTE, R.

Contribution à l'histoire de la pomologie: les variétés de fruits d'origine belge. (**A contribution to the history of pomology: the varieties of fruits of Belgian origin**).

Ann. Gembl. 1954: 60: 17-40.

This documented history of fruit growing in Belgium from the earliest times up to the nineteenth century records the names of many amateur horticulturists who bred famous varieties of apples, plums, greengages, cherries and peaches.

3260 MILLER, E. V.

**Our heritage of good fruits.**

Sci. Mon., NY 1953: 77: 42-48.

A popular account of ways in which spontaneous mutations may arise is given and the origin of a number of commercial American varieties of apple, orange, peach and grapes is traced back to such mutations.

3261 Riktsortlista for förvärvs- och husbehovsodling av frukt utgiven av Sveriges Pomologiska Förening. (**Guide to varieties for commercial and home cultivation of fruit, issued by the Swedish Pomological Association**): 1953: unpaginated.

Lists of varieties of apples, pears, plums and cherries, recommended for growing in various zones of Sweden, are set out, with information on suitable pollinators in each case and with two maps indicating the zones of cultivation.

3262 ANJOU, K.

Vinterskador på äpple- och päronträd vid Balsgård 1953. (**Winter injuries in apples and pears at Balsgård, 1953**).

Sverig. pomol. Foren. Årsskr. 1953: 139-47.

Records of frost damage at the Balsgård Institute in Sweden revealed varietal differences in the incidence and degree of root, trunk, bud and leaf injury to apple and pear trees. Though most of the tetraploid apples, especially derivatives of Belle de Boskoop, showed severe bud damage, tetraploids of Husmoder [Mère de Ménage] were comparatively undamaged.

Apple varieties showing practically no injury of the above types are enumerated.

3263 KIRKHAM, D. S.

**Significance of the ratio between the water-soluble aromatic and nitrogen constituents of apple and pear in the host-parasite relationships of *Venturia* species.**

Nature 1954: 173: 690-701.

Evidence has been obtained in experiments at the East Malling Research Station, England, suggesting that the behaviour of a clone of *V. inaequalis* or *V. pirina* in relation to the aromatic C/N ratio of the host is a critical factor controlling degree of pathogenicity. In the light of this probable relationship, investigations are being carried out on the qualitative nature of the differences in scab reaction shown (1) by the young leaves of varieties characterized by varying degrees of resistance and (2) by the susceptible young leaves and immune mature leaves of the less resistant varieties. When mature, the leaves of all varieties are immune from infection.

3264 AHUNDZADE, I. M. & AGADŽANOV, A. G. (**Indoor cultivation of dwarf apples**).

Priroda (Nature) 1954: No. 3: 111-12. [Russian].

An early bearing form from Azerbaïdžan, suitable for indoor cultivation, is described. Adult trees are 90 cm. tall and yield 4-5 kg. of good quality fruit.

- 3265 SCHAER, E.  
Eine Farbmutation der Apfelsorte "Wellington." (**A colour mutation in the apple variety "Wellington"**).  
Schweiz. Z. Obst. u. Weinb. 1949 : 58 : 246-48.

A red-fruited form of Wellington, arising from a somatic mutation, is reported from the Federal Experiment Station, Wädenswil, Switzerland.

- 3266 CHEVALIER, A.  
L'origine des poiriers et pommiers sauvages de nos forêts et la part qu'ils ont prise dans la formation des variétés cultivées. (**The origin of the wild pear and apple trees in our forests and the part they have played in the creation of the cultivated varieties**).  
Rev. Bot. appl. 1953 : 33 : 583-85.

This article has been summarized already in Abst. 1388.

- 3267 JOHANSSON, E.  
Alfa 68, den första tetraploida äpplesorten från Alnarp. (**Alfa 68, the first tetraploid apple variety from Alnarp**).  
Sverig. pomol. Foren. Årsskr. 1953 : 35-39.

Alfa 68, thought to be the first tetraploid apple raised from a cross between commercial varieties, is derived from a 68-chromosome seedling found among the progeny of a cross of the triploid Belle de Boskoop and the diploid Danish apple Filippa. The tree, which is very vigorous with spreading branches, comes into bearing rather late, but crops well subsequently. The large fruits are roundish oval, flattish and similar in shape and colour to those of Belle de Boskoop; the flesh is cream coloured, firm and crisp and has a pleasant faintly acid flavour. The ascorbic acid content is 10-15 mg. per 100 g. The fruits are too large for dessert apples but are excellent for cooking.

- 3268 HUNTER, A. W. S.  
**Tetraploidy in vegetative shoots of the apple.**  
J. Hered. 1954 : 45 : 15-16.

A method of colchicine induction of tetraploidy, found to be effective at the Central Experimental Farm, Ottawa, Ont., is described in detail. The terminal buds were treated, when the new shoots of budded stock were 8-12 inches long, with 1% colchicine in an agar gel contained in a water-proofed gelatin capsule. In the following spring, lateral shoots were allowed to form but only from those nodes previously marked as having subtended leaves with large stomata. Tetraploid spurs, distinguished by pollen grain size, were forced

into vegetative growth, and were subsequently examined with respect to stoma size and leaf shape and thickness. Buds thus found to be tetraploid were used for propagation during the summer of the same year.

- 3269 BISHOP, C. J.  
**The inheritance of tree and fruit characters in natural polyploid apple seedlings.**  
Proc. Amer. Soc. hort. Sci. 1953 : 62 : 327-33.

Observations of seedlings at the Experiment Station, Kentsville, Nova Scotia, showed that those with the same level of polyploidy had a greater similarity than plants of the same genetic constitution but with different levels of polyploidy. Leaf thickness and stomatal length appeared to be the most reliable indicators of polyploidy. The polyploid fruits were larger but of inferior quality.

- 3270 STOLL, K.  
Neuere Arbeiten über die Vitamin-C-Wirksamkeit von Apfelsorten mit verschieden hohem Ascorbinsäuregehalt. (**Recent work on the vitamin C efficacy of apple varieties with different contents of ascorbic acid**).  
Obst. Weinb. 1954 : 63 : 236-37.

Experiments conducted at the Federal Research Institute, Geisenheim, Switzerland, showed that Croncel, Berlepsch, Ananasreinette [Pineapple Reinette], Ontario, Wintergoldparmäne [Winter Golden Pearmain], Canada Reinette, Boskoop, Adams Parmäne [Adam's Pearmain], Baumanns Reinette and Klarapfel possessed a high content of ascorbic acid.

- 3271 FRITZSCHE, R.  
Eine neue Situation in bezug auf die abwechselnde Tragbarkeit bei den Kernobstbäumen. (**A new situation in relation to alternate bearing in pome fruits**).  
Schweiz. Z. Obst. u. Weinb. 1954 : 63 : 211-14.

Varietal differences in the reaction of apples to spraying with  $\alpha$ -naphthylacetic acid, designed to reduce fruit set, are noted.

- 3272 WURGLER, W., AUBERT, PH., CHARRIÈRE, J. & DUFOUR, A.  
La lutte contre l'alternance de la fructification des arbres fruitiers par l'éclaircissage chimique. (**The battle against alternate bearing in fruit trees by means of chemical thinning**).  
Rev. rom. Agric. 1954 : 10 : 32-34.

In tests at Lausanne, Switzerland, thinning of



apples by spraying with solutions of naphthalene-acetic acid led to a modification of the biennial bearing cycle in Belle de Boskoop [Boskoop Beauty]; annual bearing was also often induced in Reine des Reinettes [Queen of the Reinettes] and Reinette de Champagne [Champagne Reinette]. Gravenstein, Rose de Berne [Berne Rose] and Louise-Bonne were not affected.

3273 POPOV, V. N.

**(The vigour of apple progeny in relation to the pollinator).**

Agrobiologija (Agrobiology) 1954 : No. 1 : 146-49. [Russian].

Several apple varieties gave more vigorous progenies when pollinated with the mixed pollen of some large-fruited local varieties than with the pollen of a variety possessing similar properties to those of the maternal parent.

3274 OLDÉN, E. J.

Växtförädlingsarbeten med äpplegrundstammar. **(Breeding experiments with apple rootstocks).**

Sverig. pomol. Foren. Årsskr. 1953 : 40-57.

The research programme of the Swedish Association for Fruit Tree Breeding includes the breeding of new types of apple clones suitable for Swedish conditions as regards hardiness and resistance to diseases and pests. Attention is also being given to the possible use of apomictic seedlings as rootstocks. Apomictic progeny are known to occur in *Malus hupehensis*, *M. toringoides*, *M. sikkimensis* and *M. sieboldii*. Various polyploid forms of *M. hupehensis* also occur; the triploid is being tested as a rootstock, and pentaploid apomicts are also being studied. They seem completely resistant to both scab and mildew.

The initial seedling material for the production of clonal stocks was obtained from controlled crosses; from seeds from known apple varieties and types obtained by open pollination; and from mixtures of apple varieties and wild types. Crosses were made mainly between hardy varieties and MIV and MIX, but also between A2 and some E. Mallings stocks. Out of the 66 types ultimately obtained only 43 can be regarded as clonal stocks.

In 1950 large-scale crosses were made between *M. baccata* and MIV and MIX to obtain specially hardy clonal stocks. *M. robusta* and the Dolgo crab were also crossed with E. Mallings stocks. The combinations MIV x A2 and MIX x A2 differed greatly in plant height. Hybrid progeny from *M. baccata* crossed with MIV or MIX showed marked resistance to scab; MIV seems to

transmit a higher degree of resistance than MIX. Adventitious root formation and root growth, thickness and strength are also being studied, and budding and grafting experiments with *M. baccata* hybrids from 1947 crosses have been carried out to determine their compatibility with commercial varieties.

3275 BISHOP, C. J.

**Mutations in apples induced by X-radiation.**

J. Hered. 1954 : 45 : 99-104.

At the Kentville Experimental Station, Nova Scotia, nine fruits that were sectorial chimeras for colour were obtained from X-irradiated scions of Cortland. The observed colour changes were in the direction of more or less red colour compared with the fruits of the controls.

3276 JAMALAINEN, E. A.

Suomessavijeltyjen omenalajikkeiden säilyvyydestä varastossa. **(On the preservation in storage of apple varieties cultivated in Finland).**

Maataloust. Aikakausk. 1953 : 25 : 136-46.

Preliminary investigations on the effect of different conditions of temperature and humidity on the keeping qualities of several named varieties of apple are described. Of the varieties tested, Åkero, Antonovka and Linda were the best keepers, being fit for consumption until late April. The chief loss through disease was that due to *Gloeosporium album*, which was most serious where humidity was highest. Data on loss through attack by *Penicillium*, *Fusarium*, and *Sclerotinia* spp. are also given, the variety Loko having the greatest over-all resistance.

3277 DEMČENKO, V. N.

**(An experiment on desert reclamation).**

Priroda (Nature) 1954 : No. 3 : 70-73. [Russian].

Economic plants adapted to the climatic and soil conditions of the desert region south of Lake Balhaš, Kazah SSR, include the new apple varieties Balhašskoe Rannee [Early Balhaš], Balhašskoe Zolotistoe [Golden Balhaš] and Hybrids 3 and 8, which are interesting for their hardiness, high yield and good quality fruit.

3278 EMMERT, F. H. & HOWLETT, F. S.

**Electrolytic determinations of the resistance of fifty-five apple varieties to low temperatures.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 311-18.

Varieties tested at Ohio State University were

placed in three categories: (1) varieties which became resistant to low temperatures early in the autumn; (2) varieties which developed a high level of resistance in mid-winter; and (3) varieties which remained resistant in the early spring. Differences in hardiness between the varieties decreased as the season advanced.

- 3279 OLDÉN, E. J.  
Frysningförsök med äpplegrundstammar. (**Freezing experiments with apple rootstocks**).  
Sverig. pomol. Foren. Årsskr. 1953 : 122-31.

One of the main aims in rootstock breeding at the Balsgård Institute in Sweden is the production of winter hardy types (cf. Abst. 3274), and artificial freezing tests have been in progress since 1949.

Laboratory freezing experiments in the winters of 1950, 1952 and 1953 were carried out on both twigs and roots of some new clonal stocks raised at the institute. Some of the new types of clonal stocks proved very resistant to cold, e.g. *M. robusta*, A2 and BM10019, 10055, 10113 and 10300. The clones BM10289 and BM36 showed excellent regeneration of the roots after freezing.

- 3280 FERNQVIST, I.  
Frostskador på fruktträd i övre Norrland. (**Frost injuries on fruit trees in upper Norrland**).  
Sverig. pomol. Foren. Årsskr. 1953 : 153-57.

In experiments at Öjebyn, Sweden, the apples Antonovka, Hiberna, Stenbock, Suislepper and Melba have been the only varieties out of a large number tested that seem capable of withstanding to some extent the severe conditions of upper Norrland. There are, however, some hybrid trees which have undergone selection, primarily for hardiness, and seem very resistant to frost; twenty of them have borne fruit and the quality of the apples from seven has been high enough to justify further testing of the trees.

- 3281 PLOCK, H.  
Die Stamm- bzw. Gerüstbildnersortenfrage in rauhen Höhegebieten und Gebirgslagen. (**The question of varieties of stem and frame builders in inclement districts at high altitudes and in mountainous regions**).  
Mitt. Versuchsanst. Wein- u. Obstb. Klosterneuburg Gartenb. Schönbrunn 1954 : Ser. B : 4 : 111-15.

Experiments at Geisingen, Germany, to determine which varieties of apple, pear, plum and

cherry are most suitable for cultivation at high altitudes are described briefly. In the period 1950-52, the apple varieties Unseldapfel and Antonovka proved resistant to frost and displayed the most vigorous vegetative growth. The question of the most suitable stocks for these varieties is discussed.

- 3282 DAYTON, D. F., SHAY, J. R. & HOUGH, L. F.  
**Apple scab resistance from R12740-7A, a Russian apple.**  
Proc. Amer. Soc. hort. Sci. 1953 : 62 : 334-40.

Data on fruit quality and segregation for resistance to *Venturia inaequalis* are tabulated for the progeny of crosses between *Malus pumila* R12740-7A and commercial varieties made at the Agricultural Experiment Stations of Illinois, New Jersey and Purdue University, Indiana. The genotype *AaBbXxYyZz* for resistance in R12740-7A is suggested, *A* and *B* each giving 100% resistance, *X* 75% resistance and *Y* and *Z* 35% resistance. *F*<sub>1</sub> seedlings displayed the upright form and vigorous growth habit of R12740-7A, but back-crossing to the commercial parent is necessary to combine resistance with good fruit quality.

- 3283 GRANHALL, I.  
Kan äppelskorven bemästras genom växtförädling? (**Can apple scab be conquered through plant breeding**).  
LantbrVeckan 1953 : 69-77 also Sverig. pomol. Foren. Årsskr. 1953 : 17-28.

This lecture to the Swedish Pomological Association on 15 March, 1953, outlined the efforts that are being made in Canada, the USA, Sweden and Germany to elucidate the hereditary basis of resistance to scab, with a view to the ultimate production of resistant varieties. In breeding for resistance, the Balsgård Fruit Breeding Institute has now at its disposal, in addition to *Malus floribunda* seeds received from the USA, a varied Swedish assortment of cultivated and wild forms, as well as scions from new scab-resistant varieties received from German research institutes.

- 3284 Schurftresistentie in appels. (**Resistance to scab in apples**).  
Versl. StudKring. PlantVeredel., Wageningen 1953 : 561-68. (Mimeographed).

The breeding of resistant varieties and the difficulties arising from the appearance of new physiological races of *Venturia inaequalis* are discussed. The wild species *Malus floribunda*, *M. atrosanguinea* and *M. micromalus* possess



genes for resistance to the fungus but the incorporation of these genes into commercial varieties would necessitate at least five generations of back crossing. Alternatively, resistant seedlings may be selected from among the progeny of open-pollinated commercial strains; here, however, difficulties arise from the heterozygous nature of cultivated varieties.

3285 HOUGH, L. F., SHAY, J. R. & DAYTON, D. F.

**Apple scab resistance from *Malus floribunda* Sieb.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 341-47.

Breeding work carried out at the Agricultural Experiment Stations of Illinois, New Jersey and Purdue University, Indiana, has shown that the resistance to *Venturia inaequalis* of clone 821 of *M. floribunda* is due to a single dominant gene. Resistance does not appear to be closely linked with undesirable fruit and tree characters.

3286 VORŽEVA, L. V.

**(Horticulture around lake Baikal).**

Priroda (Nature) 1954 : No. 2 : 101-03. [Russian].

The new apple variety Čerembass [Čeremhov Basin], from Sejanec Pudovščiny [Pudovščina Seedling] x Aport, is hardy under Siberian climatic conditions and produces large fruits of good quality.

3287 SHAY, J. R., DAYTON, D. F. & HOUGH, L. F.

**Apple scab resistance from a number of *Malus* species.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 348-56.

Tabulated data are presented on fruit quality and segregation for resistance to *Venturia inaequalis* in the progenies of crosses made at the Agricultural Experiment Stations of Illinois, New Jersey and Purdue University, Indiana, between commercial varieties and the resistant types *M. prunifolia* '19651,' *M. atrosanguinea* '804' and *M. zumi* var. *calocarpa*. The improvement in size and quality of back cross progenies is promising, whilst favourable skin and flesh qualities were found in some of the scab-resistant parents.

3288 BAGENAL, N. B.

**History and development of the cultivated fruits (Part II).**

Rev. Ass. Agric., Lond. 1954 : No. 23 : 35-43.

A brief historical survey of the cultivation of pears in England since the Middle Ages is given,

together with information on the eating quality of the principal varieties (cf. Abst. 2379).

3289 ČERNENKO, E. S.

**(The mentor effect in changing the morphological and physiological properties of a hybrid between the pear and apple).**

Ž. obšč. Biol. (J. gen. Biol.), Moscow 1953 : 14 : 369-87. [Russian].

Detailed data on morphological and biological changes, observed in an apple-pear hybrid when trained upon various pear or apple stocks, are presented. The hybrid was obtained by pollinating the pear Tonkovetka [Thin Stalk] with mixed apple pollen. It was then trained upon the apple Pervenec [First-born].

3290 HASKELL, G.

**The stamen constancy of diploid and polyploid pears.**

New Phytol. 1954 : 53 : 349-53.

Stamen numbers were determined in 19 diploid, 5 probable diploid, seven triploid and two tetraploid varieties of cultivated pear. Stamen number was a highly constant character, all the varieties having a mode of 20, except for a few varieties with higher values. Style number was also highly constant at 5, except for the slight variation shown by some varieties. Stamen number was not related to polyploidy, ceonal age, time of blossoming or phenotype. It is suggested that the constancy of stamen number in pears may be a manifestation of the secondary chromosomal balance of the Pomoideae ( $x = 17$ ), in contrast to the wide variability in this character within species of the Prunoideae ( $x = 7$ ) as previously reported (cf. Abst. 2384).

3291 Four new pears.

Amer. Nurseryman. 1954 : 99 : No. 10 : p. 39.

The pears Dabney, Ayres, Mooers and Hoskins, recently released by the Tennessee Agricultural Experiment Station, combine the dessert qualities of European pears with the disease resistance of Oriental types. Dabney is a summer pear; Ayres ripens in late August and early September; the fruits of Mooers can be ripened off from late October until December; Hoskins is a winter pear picked at the beginning of October. All four are practically immune from fire blight. Mooers and Hoskins are suitable for canning as well as for dessert purposes.

3292 KORDON, R. JA.

**(The quince in the USSR).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 65-101. [Russian].

A general account is given of the quince and its

varieties. Data are given on the distribution of wild quinces in the Caucasus region and Central Asia, from which the suggestion emerges that the centre of diversity occurs in the Iranian littoral of the Caspian Sea. Considerable variation in plant and fruit characters occurs, the smallest leaves and fruits being found in the wild quinces of Talyš; they are larger in those of Kopet Dag and larger still in those of southern Dagestan and Azerbaidžan, where the greatest diversity of characters within the Soviet territories occurs; some of the best types in Kajagent have undoubtedly provided the material from which the local cultivated quinces have arisen. Very drought-resistant quinces have been found in Apšeron, and salt-tolerant forms in Astrahanj.

Investigations on the biology of flowering have shown that the need for cross pollination varies according to variety; for instance the Bereckii quince gave better fruit sets from selfing than from open pollination; it also produced parthenocarpic, seedless fruits when pollinated with the pear.

Directions are given for quince cultivation and the main existing varieties are described. The variety with the largest fruits is the Caucasian quince Kyš, with fruits weighing 2.5 kg.; the Central Asian varieties have fruits which, though smaller, are of higher quality and Samarkand Large Yellow, Širin [Sweet] and Early Oš can be eaten even raw. The Astrahanj variety is hardy but not so resistant as Mičurin's Severnaja [Northern], from *Cydonia oblonga* x *C. vulgaris*, which is also drought resistant and in spite of its small fruit and mediocre quality is regarded as a useful parent in breeding work.

**3293 NEKRASOV, V. V. & OSTAPENKO, V. I.**  
(The oxidizing capacity of the tissues of some cultivated plants).

Agrobiologija (Agrobiology) 1953 : No. 5 : 153-55. [Russian].

The cambium in male plants of diecious species such as *Actinidia* sp. and *Ribes alpinum* and *Vitis amurensis* had a higher oxidizing capacity than that of the female or hermaphrodite plants. An examination of a number of hermaphrodite species showed that where the species with the higher oxidizing capacity was used as pollen parent better results were obtained in crossing; thus, for example, *Cerasus besseyi* x *Prunus spinosa* and *C. besseyi* x *Armeniaca vulgaris* gave much better sets than the reciprocals.

**3294 SLUDSKAJA, L. A.**  
(Tumour formation and other pathological phenomena after wide crossing in stone fruits).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 59-64. [Russian].

Tumours and other growth disturbances were noticed in both  $F_1$  and  $F_2$  seedlings from crosses of myrobalan x apricot, apricot x *Prunus salicina* and apricot x (myrobalan x *Armeniaca dasycarpa*); certain more complex crosses developed swellings about 5-10 cm. from the ground and ultimately died.

Histological studies were made of the tumorous stems of some of the myrobalan x apricot hybrids. There were no signs of any parasitic infection and the tumours seemed to arise from irregular cambial division.

**3295 KOVALEV, N. V.**  
(An experiment on transforming the nature of the common apricot).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 102-36. [Russian].

The local apricots of Soviet Central Asia possess certain qualities absent in all other apricots, such as resistance to extremes of temperature and to drought, high yielding ability, high sugar content of up to 20% in the fruits, and high quality of the dried fruits; they are, however, more susceptible to fungous diseases than the European apricots. Seed from open pollination was taken from a number of these varieties and some 25 of the best seedlings from each were grown on, some under favourable and some under less favourable conditions. The progeny of each of the varieties are described; some of the seedlings exceeded the parent variety in frost or disease resistance, in flavour or in size of fruit. The hardest seedlings were those in which the flower buds developed most slowly; one of them, named Zard, came through a frost of  $-30^{\circ}\text{C}$  in January 1949 with 86% of its buds undamaged. No correlation was detected between sugar content and disease resistance, and one of the most resistant varieties of all, VIR 1305 [Institute of Plant Industry 1305], which is a hybrid of Suphany x a European apricot, contains 10% sugar and 2% acid in its fruits.

A number of natural hybrids of apricot x myrobalan (*Prunus cerasifera*) found in orchards in Central Asia were studied; some are completely sterile, the majority partially so; one is self fertile, the rest self sterile; they flower later



than the apricot and hence are less injured by frosts; they are also more resistant to diseases. Some have smooth fruits, some felled, and 60–65% of them have sweet kernels; the sugar content of the fruits is only 7–8% and they are very acid; they are suitable for preserving, however, and the hybrids could be cultivated in areas where apricots and plums cannot because of keen winter or spring frosts or fungous attack. Attempts to produce hybrids artificially by pollinating 12 thousand flowers of various kinds of myrobalan with apricot varieties were all unsuccessful; when mixed pollen from various apricots was used, sets of up to 13.6% were obtained; 41 seedlings were produced from 105 seeds and of them at least 14 were true hybrids and resembled the natural hybrids. Seeds from open pollination of some of the natural hybrids gave rise to  $F_2$  seedlings which mostly died at an early stage unless very carefully protected from nematode and fungus attack. The hybrids, when emasculated and pollinated with various apricots, either alone or mixed, or with mixed pollen of apricot and myrobalan, set a certain amount of seed but no seedlings were produced; when emasculation was omitted, a number of seedlings were obtained but most of them died before reaching the third year unless grafted on to myrobalan, when they gave rise to normal plants; those which have come into bearing have fruits resembling those of the first generation.

Twelve hybrids obtained by pollinating *P. salicina* with apricot were much inferior to the hybrids with *P. cerasifera* in respect of disease resistance but were equal in frost resistance; their fertility was lower and they gave sets varying from 2 to 39% with apricot and 1 to 27% with *P. cerasifera* and *P. salicina*. The fruits of these hybrids are larger and much better in flavour than those from the *P. cerasifera* hybrids but are soft and apt to be blown off by wind.

A hybrid of *P. salicina* x *P. cerasifera*, characterized by resistance to *Clasterosporium* and *Monilia* as in the latter species, pollinated with a mixture of apricot pollen, gave rise to 28 seedlings, of which 11 survived; of these, 9 proved to be hybrids with the apricot and displayed characters of all three species, and were resistant to *Clasterosporium*. Second-generation plants obtained from open pollination of the hybrids of apricot x *P. salicina* mostly showed growth disturbances.

Crosses of *Armeniaca ansu* x *P. cerasifera* gave seedlings intermediate in type, with large, acid fruits with good aroma, similar in flavour to

those of *A. ansu*; the hybrids were self sterile but set fruit in the presence of either the apricot or the myrobalan. Hybrids have also been obtained from crosses of *P. domestica* x apricot; they have 32 chromosomes and form fruits larger than those of either parent; they flower 12 days later than the apricot.

A number of seedlings selected from the above crosses exceed all European and many Central Asian apricots in frost tolerance and in flavour; a list of these hybrids, with brief descriptions and indications of their origin, terminates the article.

3296 KOVALEV, N. V. & BONDAREVA, V. S.  
(Chemical qualities of the fruits of the apricot).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 234–42. [Russian].

Figures are given showing the content of dry matter, total sugars, glucose and fructose, sucrose and acids in *Armeniaca mume*, *A. ansu*, *A. sibirica*, *A. davidiana*, *A. mandshurica* and *A. vulgaris*. The lowest sugar content, about 3% of the fresh weight, was found in *A. mume*, *A. ansu* had over 9%, and some forms of *A. vulgaris* ssp. *orientalis* almost 29%, with an average round 15%; the highest was found in certain varieties of the Hurman group, Ak Hurman [White Hurman] having 28.95%; the varieties of the eastern group are excellent for preparing dried fruits and most of them, though susceptible to *Clasterosporium carpophilum*, are frost resistant. The varieties of the western subspecies are more disease resistant but less hardy; they have larger fruits and most of them are self fertile; their acid content is higher but their sugar content does not exceed 12%, being highest in Salgirskii, Ananasnyi [Pineapple] and Alexandre. Hybrids between the western and eastern groups contain up to 12.78% sugar and are in other respects intermediate in character; the best hybrid for dessert purpose are Komsomolec and the best for preserving are Oranževyi Pozdnyi [Late Orange] and Evropeiskii Plotnyi [Firm European].

3297 TATAUROVA, A. S.  
(Quality for making dried fruit in apricots).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 221–33. [Russian].

The various methods of preparing dried apricots in Soviet Central Asia are described. The

majority of the local varieties have a sugar content of 20% and are more suitable for drying than the western varieties. The data presented show that only about 8 of the western varieties are suitable for drying, and the eastern varieties vary in respect of size of fruit, colour of skin, colour and firmness of flesh, freeness of stone, sweetness of seed, firmness of attachment to tree, and colour, flavour and general quality of the dried product. Some are more suitable for drying whole, with or without the stone, others for drying in cut pieces. A certain number of varieties and hybrids are recommended as being suitable for use either fresh, for jam or for drying; they include Zolotistyĭ Rozovyi [Golden Pink], Zarja Vostoka [Dawn of the East], VIR 1305 [Institute of Plant Industry 1305], Novyi [New], Hurman Pozdnii [Late Hurman], Družba [Friendship], Uspeh [Success] and Prima, all hybrids between eastern and western forms.

- 3298 KOVALEV, N. V., TATAUROV, A. C. & BONDAREVA, V. S.  
(Yield and quality of fruits in the apricot).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 184-220. [Russian].

Yield data for a large number of apricots show that in the region of Taškent the oriental apricots were outyielded by the western and the hybrid varieties. Tabular data are given showing time of ripening, fruit weight, type of flesh and stone, flavour of fresh and stewed fruit and quality of products such as dried fruit, jam or quick-freeze. Fruit weight varies in the oriental subspecies from 7 to 80 g. but their average is 25 g., as compared with 35 g. for the western subspecies. No correlation exists between yield and fruit size and high-yielding varieties with both large and small fruits have been found. The oriental varieties have firmer flesh, higher sugar content, rough skin, sweet seeds and greater transportability than the western group; the best combination of sugar, acid and aroma is found in some of the newer hybrid varieties such as Komsomolec, Zarja Vostoka [Dawn of the East] and VIR 1305 [Institute of Plant Industry 1305], which are suitable for drying, stewing, jam or dessert. The lower quality of most early and late-ripening forms is not absolute, as is shown by the excellent quality of the variety Ak Ljučak Džaupazak, which is among the earliest.

- 3299 KOVALEV, N. V. & TATAUROVA, A. S.  
(Resistance of species and varieties of apricot to winter and spring frosts).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 137-70. [Russian].

Observations on over 400 specimens of cultivated apricots and of a number of allied species have shown that the course of flower development varies from year to year and cannot be taken as a criterion of frost resistance. The examination of sections of the flower buds under a lens after each serious frost showed the ovary to be the most sensitive part and its condition provides the best measure of the frost tolerance of the variety. Such examinations of a number of species showed wild specimens of *Armeniaca vulgaris* and the cultivated apricot Hurman 01390 to be the only ones to resist a late spring frost in 1949, which destroyed the buds of *A. mume*, *A. davidiana*, *A. sibirica*, *A. ansu* and *A. mandshurica* completely. Similar observations were made on 413 cultivated apricots and the data are tabulated for 170 of the most important varieties. The results show the existence of the following main groups: (1) forms which can grow at low temperatures and the development of whose floral organs does not require a great amount of heat; this group when grown in Central Asia is often damaged by spring frosts, particularly after relatively warm winters which permit the flower buds to develop; the group includes the far-eastern species *A. ansu* and *A. mume*, Mičurin's hybrids, and wild forms of *A. sibirica* and *A. davidiana*; the hardest in this group are the wild forms of *A. mandshurica*; (2) forms with high heat requirements in the stage of flower bud development, which therefore blossom 15-60 days later than those of group (1); this group comprises the cultivated apricots of Central Asia and Asia Minor, belonging to *A. vulgaris* subsp. *orientalis*, which are quite tolerant of both winter and spring frosts; (3) the cultivated apricots of southern Europe, the flowers of which begin to develop in warm winters and are easily injured by spring frosts; (4) hybrids between groups (2) and (3), many of which occur in the northern part of Central Asia, others of which have been produced artificially; they have a slow floral development and comprise the hardest group of all; they are also more disease resistant than other groups. The behaviour of the main varietal types is described.



## 3300 LJUBENKOV, A. A.

**(Apricots in the Brest province).**

Priroda (Nature) 1954 : No. 3 : 89-91.  
[Russian].

Hardy forms, obtained in White Russia by raising the  $F_2$  of stones originating in Dnepropetrovsk, are described. They are annual bearers and yield 50-200 kg. per tree. The fruits, which mature in July or August, are small but have an attractive appearance and flavour.

## 3301 KOVALEV, N. V.

**(Resistance of apricots to attack by shot hole).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 171-83. [Russian].

The shot-hole disease of peaches and apricots due to *Clasterosporium carpophilum* is described. It was particularly serious in 1947 and 1949 and data are presented showing the behaviour of a number of apricot varieties and species in those years. *Armeniaca mandshurica* displayed a certain degree of resistance, *A. sibirica*, *A. davidiana*, *A. mume* and *A. ansu* were severely attacked; all forms of *A. vulgaris* were attacked but in varying degrees, the oriental forms, with the exception of varieties Ahrori and Arzami, being more susceptible than the western.

The reaction of the main groups of varieties is described, special reference being made to occasional forms showing a certain degree of resistance in the oriental subspecies, since these are of special interest on account of the greater sugar content of their fruits. Some of the hybrid varieties are equal to the western apricots in resistance and are superior in fruit quality; hybrids of apricot x myrobalan (*Prunus cerasifera*) proved particularly resistant and were also distinguished by their frost resistance.

## 3302 GUŠČIN, M. F.

**(The effect of external conditions upon pollination).**

Sad i Ogorod (Gdn. & Veg. Gdn.) 1954 : No. 5 : 53-56. [Russian].

Pollination experiments with plums in Dagestan included tests of some pollen mixtures. The green-gage set many fruits when fertilized by the pollen of Altana Gage + Persikovaja [Peach] or Altana Gage + Renklod Mestnyi [Local Gage], but its fertility was low when the pollen mixture Persikovaja + Renklod Mestnyi was used. It is thought that the pollen of Persikovaja inhibits the growth of pollen of Renklod Mestnyi.

## 3303 KAZJMIN, G. T.

**(*Prunus ussuriensis* as a mentor).**

Agrobiologija (Agrobiology) 1953 : No. 5 : 140-45. [Russian].

*P. ussuriensis* starts its growth in spring at a lower temperature than any other species of *Prunus* and its autumn growth is also completed sooner; it resists temperatures of  $-50^{\circ}\text{C}$  and the various other rigours of the climate of the Soviet Far East. Various nonhardy seedlings of plum, cherry and apricot when budded on to *P. ussuriensis* also became hardy.

## 3304 STANČEVIĆ, A. &amp; PAVIČEVIĆ, B.

Intenzitet napada šarke na razne sorte šljiva u rejonu Toplice. (**Intensity of attack of *Prunus virus 7* on different plum varieties in the Toplica region**).

Zaštita Bilja 1954 : No. 22 : 38-46.

Of the main varieties cultivated in the region, Crvena Ranka [Red Early], Rana Mirabela [Early Mirabelle] and Bilka Rana [Early Bilsk] showed the highest degree of resistance to *Prunus virus 7*. Mention is also made of a local apricot variety, Krupna Ranka [Big Early], which appeared to be immune from the virus.

## 3305 New black sweet cherry.

Amer. Nurserym. 1954 : 99 : No. 6 : 66-67.

Sam, a moderately hardy variety from the Summerland Experiment Station, BC, Canada, is described. It shows vigorous growth and produces a good yield of high quality fruit suitable for canning purposes and fairly resistant to cracking. The tree, which is self-sterile, can be cross-pollinated with Bing, Lambert or Van. It matures seven to ten days earlier than Bing.

## 3306 Meteor cherry.

Amer. Nurserym. 1954 : 99 : No. 7 : p. 61.

Meteor, a red, high yielding cherry, moderately resistant to frost, was produced at the Minnesota Agricultural Experiment Station from a cross between Montmorency and a hardy, small-fruited variety obtained from Canada. The tree has large leaves resistant to leaf spot, and upright habit and vigorous growth. The large, attractive fruit, which ripens seven to ten days later than Northstar, has a thin, tender skin and firm, yellow, juicy flesh with a pleasant, slightly acid flavour. The stone is small and free.

## 3307 Peach resistant to bacterial spot.

Amer. Nurserym. 1954 : 99 : No. 9 : 30-31.

Ranger, a variety maturing at the same time as Golden Jubilee and adapted to the mid-south,

was selected at the Plant Industry Station, Beltsville, Md. from selfed progeny of Raritan Rose. The medium to large, free-stone fruits have yellow flesh of good flavour and a slightly pubescent, yellow skin with a red blush; they are suitable for canning and freezing. The variety gives good yields, grows vigorously and is self fertile, ripening three weeks earlier than Elberta. Ranger possesses resistance to bacterial spot similar to that of Hiley and Raritan Rose.

3308 OBERLE, G. D. & NICHOLSON, J. O.

**Implications suggested by a peach to nectarine sport.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 223-26.

A mutant nectarine occurring on a tree of the Redcrest peach at the Virginia Agricultural Experiment Station was less than half the size of peaches on the same tree. This indicates that a reduction in fruit size is associated with the nectarine character, for which Redcrest appears to be heterozygous.

3309 EVREINOFF, V.-A.

**Note sur l'origine des nectarines. (Note on the origin of the nectarine).**

Rev. Bot. appl. 1953 : 33 : 577-81.

Different theories on the parentage of the nectarine and its introduction to Europe are discussed.

3310 YATOMI, T., KOGA, K. & UCHIDA, H.

**(On the germination of the pollen of *Citrus natsudaoidai*).**

Yamaguchi Daigaku Nogakubu  
Gakujutsu Hokoku/Bull. Fac. Agric.  
Yamaguti Univ. 1952 : No. 3 : 161-65.  
[Japanese].

Pollen of the above species remained viable for 150 hr.; for pollination, however, it should be used within 40 hr. Pollen germination, even after 150 hr., was markedly enhanced by minute concentrations of 2,4-D.

3311 IVANOVSKAJA, T. L.

**(Fruiting of lemon seedlings under Moscow conditions).**

Agrobiologija (Agrobiology) 1953 : No. 5 : 145-50. [Russian].

Several lemon seedlings have begun flowering in a greenhouse in Moscow and two of them have now borne fruit, from which seeds have been obtained and sown for the production of a second generation.

3312 DU PREEZ, D. & BOYES, W. W.

**The persimmon (*Diospyros Kaki* L.F.).**

Fmg in S. Afr. 1954 : 29 : 139-40, 145.

Varieties grown at Stellenbosch were divided

into group A types with large, rounded fruits and group B with small pear-shaped fruits. In group A, Osmond, Kingcut and Tipo-Tipo gave the best yields, and in group B, Kulco-Kulmar and Nitaru. Tanenachi, Mazeli and Tipo-Tipo were used in storage tests in which Tanenachi appeared to have the best storage quality.

3313 ŠČEPOTJEV, F. L.

**(Perfect flowers of walnut trees).**

Priroda (Nature) 1954 : No. 3 : 92-94.  
[Russian].

A walnut tree, in the Harjkov province, flowering a second time after its first blooms had been damaged by frost, bore some perfect flowers. A detailed description of these is given, with notes on the possible evolution of the walnut flower.

3314 KALMYKOV, S. S.

**(Walnut varieties in southern Kazakhstan).**

Sad i Ogorod (Gdn. & Veg. Gdn.) 1954 : No. 5 : 60-62. [Russian].

Material developed at Bostandyk, including the recent selections Ideal and Oripov, is described. These two varieties come into bearing in the second year and produce two crops a season; both are resistant to pests and their nuts have a thin shell and a well-formed kernel of good flavour. The nuts of Ideal weigh 10.4 g. each, those of Oripov 8 g. each.

3315 ŠČEPOTJEV, F. L.

**(Walnut forms resistant to spring frost must be developed).**

Les. Hoz. (Forestry) 1953 : No. 1 : 69-70.  
[Russian].

A hardy, late-flowering Kirgizian form and some hardy Ukrainian material, including new hybrids between *Juglans nigra* and *J. regia*, are mentioned.

3316 BROOKS, M.

**Improved varieties of black walnuts for West Virginia.**

Bull. W. Va. agric. Exp. Sta. 1953 : No. 363 : Part 1 : 3, 6-7.

Information on the performance of the varieties Thomas, Ohio, Stabler and Ten Eyck in Upshur County, W. Va., is provided. The first-named variety has so far given the best results; it has displayed outstandingly good resistance to *Nectria* canker.

3317 BEATTIE, R. K. & DILLER, J. D.

**Fifty years of chestnut blight in America.**

J. For. 1954 : 52 : 223-29.

This description of damage caused in America



by *Endothia parasitica* includes a brief account of attempts to breed resistant varieties. The US Division of Forest Pathology has developed a number of hybrids resistant to the blight.

- 3318 SERR, E. F., KESTER, D. E., WOOD, M. N. & JONES, R. W.

**The Davey almond.**

Bull. Calif. agric. Exp. Sta. 1954 : No. 741 : Pp. 8.

The almond Davey (Nonpareil x Sans Faute) is described in detail (cf. Abst. 611).

- 3319 CAMBRA, M.

Polinizaciones en almendro "Desmayo." (Pollination trials with the almond variety Desmayo).

An. Estac. exp. Aula Dei 1954 : 3 : 229-32.

Pollination of the variety Desmayo gave rise to sets varying from 15.9% with Mollar de la Princesa to 38.1% with Común B [Common B], whereas selfing and open pollination gave only 3.7 and 2.09% respectively.

- 3320 SCHROEDER, C. A.

**The macadamia nut.**

Calif. Agric. 1954 : 8 : No. 4 : p. 3.

From studies in California of the yield and fruit quality of ten Hawaiian and five Australian varieties, data on the fruit quality of six promising clones are given. *Macadamia ternifolia* types appear to be more resistant to chlorosis than *M. integrifolia*.

- 3321 HAMILTON, R. A. & STOREY, W. B.

**Macadamia nut varieties for Hawaii orchards.**

Hawaii Fm Sci. 1954 : 2 : No. 4 : 2-3.

The varieties Kakea, Ikaiki, Keauhou, Wailua and Nuuanu are described. After tests over a period of 15 years these varieties are considered most suitable for cultivation in Hawaii.

- 3322 List new peanut varieties.

What's New Crops Soils 1954 : 6 : No. 8 : p. 31.

The groundnuts NC1 and NC2 have been developed at the North Carolina Agricultural Experiment Station. In trials they have given average yields of 1927 and 2281 lb. per acre, respectively.

- 3323 Research work and workers.

Seed World 1954 : 74 : No. 4 : 36-39.

Florispan Runner, a new groundnut variety developed at the Florida experiment station, Gainesville, has semierect, prolific plants producing up to four pegs to the joint. In the pegging stage the branches begin to droop and acquire a runner-fruited habit before the crop matures.

- 3324 LARROQUE, P., CHAUSSON, J. & GALLAND, Ph.

Sélection des arachides. Résultats obtenus en Casamance et au Moyen-Congo. (Groundnut selection. (Results obtained in Casamance and the Middle Congo).

Oléagineux 1954 : 9 : 341-46.

At Loudima, Belgian Congo, selection over three generations by the method used in Casamance (cf. Abst. 2412) produced lines of the Spanish type that were better adapted to the conditions of the Niari valley than was the initial strain and were also more homogeneous and gave higher yields.

- 3325 SAUGER, L.

Méthode de délimitation des zones d'adaptation des lignées sélectionnées d'arachide au Sénégal. (Method of delimiting the zones of adaptation of selected lines of groundnut in Senegal).

Agron. trop., Nogent 1954 : 9 : 21-27.

The importance of growing lines adapted to the area in which they are cultivated is discussed and a system of determining and plotting the optimal ecological distribution of a given strain is outlined. Three stages in varietal selection are recommended: (1) the testing of a large number of lines at one central station; (2) trials of a limited number of the best lines at several substations within a certain geographical area and (3) experiments to determine optimal cultural conditions for each line.

- 3326 SUZUKI, A.

**(On the characteristics of peanut varieties).**

Nihon Nogyo Kenkyusho Hokoku/Bull. Nippon Agric. Res. Inst. 1951 : 52-59. [Japanese].

Information on the following characteristics is recorded for 28 Japanese varieties: vegetative period, habit, leaf colour, disease resistance, pod shape, seed yield, testa colour and fat content.

- 3327 HERMANN, F. J.

**A synopsis of the genus *Arachis*.**

Agric. Monogr. US Dep. Agric. 1954 : No. 19 : Pp. 26.

The taxonomy of the genus *Arachis* is discussed, with reference to the classifications previously proposed by A. Chevalier, A. Burkart and F. C. Hoehne. Descriptions are given of the nine species recognized by the author, together with an identification key and map showing the distribution of the wild species in eastern South America.

- 3328 BHAVANI SANKAR RAO, M. & SRINIVASALU, N.

**White-kernelled groundnut.**

Madras agric. J. 1954 : 41 : 44-45.

Three white-seeded bunch varieties, AH 6644 from East Africa and AH 6728 and AH 6744 from Australia, have been classified as a separate group at Tindivanam. They are being used to evolve white-kerneled, high yielding lines.

- 3329 MILLER, L. I.

**Studies of the parasitism of *Cercospora arachidicola* Hori and *Cercospora personata* (B. & C.) Ell. & Ev.**

Diss. Abstr. 1953 : 13 : Publ. No. 5548 : 644-45.

It is noted that the groundnut Spanish 146 is a good differential variety for testing the pathogenicity of biotypes of the above two fungi. Of the 113 erect groundnuts tested, PI 153342 was the most resistant to *C. arachidicola*; of the 49 runner types compared, PI 149637 showed the highest degree of resistance. In an experiment on ten varieties those with the highest riboflavin content of the seed were most resistant to *C. arachidicola*.

- 3330 HEMINGWAY, J. S.

***Cercospora* leafspots of groundnuts in Tanganyika.**

E. Afr. agric. J. 1954 : 19 : 263-71.

The article includes a short account of experiments on varietal reaction to *Cercospora*. In a test during 1952 at Kongwa four varieties were classed as very resistant, viz. Kanyoma, Matevere, Katambaa 1 and HG1; all these have dark green foliage. In observations at Nachingwea, Mwitunde showed resistance. Use of varieties whose seed has a dormant period offers a promising method of eliminating post-harvest volunteers in controlling *Cercospora* infection.

- 3331 SAUGER, L. & CATHERINET, M.

**La rosette chlorotique de l'arachide et les lignées sélectionnées. (Chlorotic rosette of the groundnut and the selected lines).**

Agron. trop., Nogent 1954 : 9 : 28-36.

At the Bambey Plant Breeding Station, French Senegalese Africa, eleven selected lines of Virginia Bunch were found to possess a high degree of resistance to the rosette virus.

- 3332 SOUSA, O. F. DE & ABRAMIDES, E.

**Ensaios de variedades de amendoim. Resultados de ensaios regionais. (Tests of groundnut varieties. Results of regional trials).**

Bragantia 1952 : 12 : 349-58.

Many of the varieties tested were discarded on account of their susceptibility to *Sclerotium rolfsii*. In tests over the period 1940 to 1951 in various localities in the state of São Paulo, Brazil, the Roxo [Red] varieties generally out-yielded the others and 40-Roxo gave an average yield over the last three years of 2190 kg. per ha. as against 1400 kg. from 53-Tatu, the standard variety for the state. Promising results have also been given by 76-Spanish 2B.

- 3333 MORETTINI, A. & PULSELLI, A.

**La fecondazione dell'olivo. (Fertilization of the olive).**

Ital. agric. 1954 : 91 : 163-72.

Further reference is made to the data reported in a previous article (cf. Abst. 620), the conclusions from which were further confirmed in 1953, when the plantations consisting almost exclusively of Caninese gave hardly any yield at all, evidently owing to wet weather during the flowering period, which prevented pollen being blown in from other varieties some distance away; plots where Caninese was growing close to trees of the variety Palmarino, known to be a good pollinator for Caninese, gave excellent sets.

- 3334 Réunion d'étude du 18 Janvier 1954, tenue à l'Huilerie Expérimentale de Sfax à l'occasion de la remise des nouvelles installations par l'Office de l'Huile à l'Office de l'Expérimentation et de la Vulgarisation Agricoles. (Conference of 18 January 1954, held at the Sfax Experimental Oil Works at the handing over of new installations by the Oil Office to the Office for Agricultural Experimentation and Education).

Tunis. agric. 1954 : 55 : 1-3, 13-23.

At the above meeting, addresses were read on olive cultivation in Tunis and methods of improving production. G. Valdeyron's communication, Experimentation in Olive Culture in Tunis, refers to the advances expected to follow (a) the completion of the survey of the olive varieties in Tunis; and (b) the research programme, planned by the Station de Recherches pour l'Oléiculture et l'Arboriculture at Sfax, on the biology, genetics, cytology, ecology and cultivation of the olive.



- 3335 CUTTER, V. M. (JUN.) & FREEMAN, B.  
**Development of the syncytial endosperm of *Cocos nucifera*.**  
 Nature 1954 : 173 : 827-28.

The authors clarify certain differences between their own findings concerning the embryology of the coconut and those of Dutt. They have not detected any mitotic divisions in the free nuclei of the milk, in the endosperm vesicles or in the younger stages of the gelatinous syncytium (cf. *PBA*, Vol. XXIII, Abst. 2363). They suggest that the free and mitotically dividing nuclei observed by Dutt were in fact nuclei torn from the meristematic cells of the endosperm during opening of the nut and that prior to the formation of the endosperm meristem amitosis rather than mitosis occurs.

- 3336 HAMILTON, R. A. & STOREY, W. B.  
**Inbred line-8 an improved Solo papaya.**

Hawaii Fm Sci. 1954 : 2 : No. 4 : p. 7.

Line 8 Solo is a self-pollinated strain which was originally selected from commercial Solo papayas at the Hawaiian Agricultural Experiment Station. In comparison with the original types the fruits are smoother, larger and more uniform. Fewer carpelloid fruits are produced and the length of the sterile period during the summer has been reduced.

- 3337 PORPÁČZY, A. & FARAGÓ, M.  
 Szedermálna fajhibridek. (**Blackberry-raspberry interspecific hybrids**).  
 Agrártud. egy. 1950 : 1 : 3-9.

At the Institute for Horticultural Research, Eszterháza, Hungary, crosses between the raspberry variety Lloyd George and *Rubus caesius* gave fertile hybrids producing heavy yields and with fruit similar to that of the raspberry parent. A cross between this hybrid and *R. loganobaccus* resulted in frost, drought and disease resistant strains giving high yields and possessing fruit similar to that of the blackberry.

- 3338 NYHLÉN, Å.  
 Försök med hallon vid Nyckelby 1944-1952. (**Trials with raspberries at Nyckelby, 1944-52**).  
 Sverig. pomol. Foren. Årsskr. 1953 : 79-86.

In these Swedish trials, seven commercial varieties and five clones from various crosses were tested for yield, earliness and fruit quality. The Swedish raspberry Miranda (cf. *PBA*, Vol. XXI, Abst. 2996) outyielded all the other varieties and seems the most suitable for regions like the eastern part of central Sweden, where

early summer droughts occur. The variety Mitra, too, gave quite high yields under more favourable conditions.

Asker, Marlborough and Miranda appeared to stand transport better than the other varieties.

- 3339 HASKELL, G.  
**The genetic detection of natural crossing in blackberry.**

Genetica 1954 : 27 : 162-72.

Experiments were carried out at the John Innes Horticultural Institution, England, to study natural crossing in the blackberry Merton Thornless (*Rubus rusticanus* var. *inermis* x *R. thyrsiger*,  $2n = 28$ ), when situated between rows of thorny *Rubus* forms, the character of glandular cotyledons being used as the marker for detecting outcrossing. On the average 17% hybridization occurred. Vicinism was significantly influenced by the position of the plant in the row, position of the flower in the inflorescence and by whether the inflorescence faced north or south; these microfactors were possibly related to bee behaviour. End plants were outcrossed 25%, plants within the row 15%; the difference was partly due to geitonogamy. Percentage of first-year germination was affected by plant and flower position but not by the orientation of the inflorescence.

- 3340 **List resistant berries.**

Amer. Nurserym. 1954 : 99 : No. 7 : p. 34.

Of the trailing blackberry varieties tested at the University of California, Cascade, Chehelem, Himalaya, Logan and Ollalie showed most resistance to *Verticillium* wilt and produced high yields.

- 3341 WILHELM, S. & THOMAS, H. E.  
**Blackberries resistant to wilt.**  
 Calif. Agric. 1954 : 8 : No. 1 : 8, 12.

The varieties Burbank Thornless, Chehelem, Himalaya, Merton Thornless, Oregon Evergreen, Logan, Black Logan, Cascade, Mammoth, Ollalie and Phenomenal, which are resistant to *Verticillium* wilt, are described briefly. A diagram showing the parentage of the last six varieties and also of Young and Cuthbert is given.

- 3342 SERGEEVA, K. D.  
**(Fruit and seed formation in gooseberry seedlings in relation to their pollinators).**

Agrobiologija (Agrobiology) 1954 : No. 2 : 144-46. [Russian].

The fruit quality of the *Sphaerotheca*-resistant hybrid 55-6, recently developed at Mîčurinsk, was improved when plants flowering for the

first time were pollinated with the pollen of large-fruited varieties such as Butyločnyi [Bottle] or with certain pollen mixtures.

- 3343 LINDEN, R.  
Les myrtilles américaines. (**American bilberries**).

Bull. Hort., Liège 1954 : 9 : 111, 115.

Data on yield, maturity and quality of fruit are presented for the American varieties Cabot, Rancocas, Concord, June and Stanley, which are recommended as being suitable for cultivation in Belgium.

- 3344 ELLIOTT, A.  
**What's new in blueberries.**

Amer. Nurserym. 1954 : 99 : No. 7 : p. 15.

A brief account of new varieties developed from *Vaccinium corymbosum*, *V. ashei* and *V. myrsinites* is given.

The *V. corymbosum* varieties Earliblue, Ivanhoe, Bluecrop, Berkeley, Herbert and Coville ripen in the above order and produce large attractive berries of good flavour. Wolcott, Murphy, Angola and Croatan are resistant to *Physalospora corticis*. Coastal and Calloway have been developed from *V. ashei* and further selections are being made.

- 3345 CORNUET, P.  
Quelques problèmes techniques de la culture du fraisier. (**Some technical problems of strawberry growing**).  
Bull. tech. Ing. Serv. agric. 1954 : No. 87 : 85-89.

Six varieties selected for 1954 by the Official Board of Control in France are listed. The breeding of new varieties should be carried out in the locality in which they are ultimately to be grown. Disease resistance problems are touched on, examples being drawn from work in other countries.

- 3346 JOHANSSON, E.  
Tre nya jordgubbsorter från Alnarp. (**Three new strawberry varieties from Alnarp**).  
Sverig. pomol. Foren. Årsskr. 1953 : 132-38.

The three varieties bred at Alnarp, Sweden, are Landia, Finn and Julia. Landia originated from a cross between an American variety, called Southland in Sweden, and a selected seedling of the American strawberry Dorsett; the plants are vigorous, productive and fairly resistant to fungous diseases. The fruits are large, dark red, conical or sometimes cuneate, and firm with light red, sweet and acid flesh, slightly scented with an agreeable flavour; they can be used

for dessert but are more suitable for preserving on an industrial scale. In deep freezing experiments the variety was one of the best. Finn, a 1942 seedling selection of the American variety Fairfax, was raised from seed from the USA; the plants are vigorous, resistant to diseases, ripening in mid-season and high yielding. Its large fruits are firm, dark red, conical or cuneate, with dark red flesh and somewhat scented flavour. Finn is suitable for commercial cultivation for preserving.

Julia originated from a 1924 cross of Späte von Leopoldshall [Late Leopoldshall] with Abundance. The plants, which are of medium size, with shiny leaves and numerous runners, give very high yields; the flesh is pink or white with a refreshing, slightly acid, flavour. It ripens later than Abundance and will extend the strawberry season in districts where the latter variety is grown.

- 3347 GUSTAFSON, B.  
Senga jordgubbar. (**Senga strawberries**).

Weibulls Allehanda 1954 : No. 1 : 17-19.

In addition to observations on the origin of the cultivated strawberry, an account is given of the two new Swedish varieties, Senga tidig [Senga Early] and Senga medelsen [Senga Mid-late], obtained by selection from the German Senga series (cf. Abst. 3348).

- 3348 CAROLI, G.  
Senga-jordgubbar, ny förädlingsprodukt av hög kvalitet. (**Senga strawberries, a new product of breeding of high quality**).

Weibulls ill. Årsb. 1954 : 49 : 37-38.

Two new varieties, selected at Weibullsholm Plant Breeding Institute from some of Sengbusch's German series of Senga strawberries (cf. PBA, Vol. XXIII, Abst. 655) are described: Senga tidig [Senga Early] and Senga medelsen [Senga Mid-late]. Both varieties are vigorous in habit and their fruits are suitable for consumption in the fresh state or for preserving and deep freezing. For an early variety, the productivity of Senga tidig is very good; its acid, aromatic fruits are perfect in colour and shape, both of which are retained on preserving and also give an attractive appearance to jam or syrup; the firmness of the berries makes them suitable for transport. Senga medelsen has large, somewhat pointed berries and when the cropping season is unusually long, exceptional yields may be obtained, e.g. records of 15,000-18,000 kg. per ha. in official trials in Germany.



## 3349 HABRAN, R.

Les variétés de fraisières à gros fruits.  
(**The strawberry varieties with large fruits**).

Bull. Hort., Liège 1954 : 9 : 179-82,  
208-213.

Morphological characters of runner, leaf, inflorescence, flower and fruit by which varieties may be differentiated are described and detailed data on Professeur Frederick Burvenick and Deutsch Evern, the two principal large-fruited strawberries cultivated in Belgium, are provided, together with information on a number of other varieties.

## 3350 SCOTT, D. H., JEFFERS, W. F., WALDO, G. F. &amp; INK, D. P.

**Resistance of strawberry varieties and selections to races of the red stele fungus.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 306-10.

Data on the resistance of selections made in Maryland and Oregon to three races of *Phytophthora fragariae* found in Maryland are presented. It was shown that the same physiological races occur in the two states. Md-US-2149 and Md-US-2159, selected from Fairland x Md 638, were resistant to all three races.

## 3351 LJONES, B.

Sortforsøk med jordbær ved Norges Landbrukshøgskole. (**Variety trials with strawberries at the Agricultural College of Norway**).

Forskn. Fors. Landbr. 1953 : 4 : No. 4 : 265-85.

Two trials, one comprising 5 and the other 12 varieties, are described, with records of yields, quality and times of flowering. Information on the origins and synonyms of the different varieties in various countries is also given. The Danish strawberries Freja, Rubin and Ydun gave higher yields than Abundance, the main variety grown in Norway, but qualitatively they were not its equal.

## 3352 SIRONVAL, C.

Un essai de forçage d'hiver de quelques variétés de fraisières à gros fruits. (**An attempt at winter-forcing several varieties of large-fruited strawberries**).

Bull. Hort. Liège 1954 : 72 : 143-46.

Varietal differences in suitability for winter-forcing are noted. In trials at Liège, Belgium, the variety Surprise ripened earliest.

## 3353 SIMMONDS, N. W.

**Notes on banana varieties in Hawaii.**  
Pacif. Sci. 1954 : 8 : 226-29.

The author gives an annotated list of indigenous and introduced varieties examined by him during a visit to Hawaii.

## 3354 SIMMONDS, N. W.

**Varietal identification in the Cavendish group of bananas.**

J. Hort. Sci. 1954 : 29 : 81-88.

Experiments designed to distinguish between the four economically important mutants of the Cavendish group showed that Dwarf Cavendish and Giant Cavendish can be distinguished from Robusta and Lacatan by persistent bracts on the male rachis. Members of these two pairs can be distinguished by leaf ratio, though not infallibly. There is a gradual increase in plant and fruit size along the series Dwarf Cavendish, Giant Cavendish, Robusta and Lacatan. Similar variation occurs between the Jamaican Gros Michel and Highgate and the Indian Nendra and Rajapuri varieties.

## 3355 GROSS, R. A. &amp; SIMMONDS, N. W.

**Mutations in the Cavendish banana group.**

Trop. Agriculture, Trin. 1954 : 31 : 131-32.

Members of the Cavendish group are generally believed to have originated from a common ancestor by a series of somatic mutations. In support of this view, two proven cases of somatic mutation are reported: Bout rond (=Lacatan) and Giant Cavendish have both been observed to produce mutant suckers of Dwarf Cavendish in commercial plantings in the La Ceiba district of Honduras.

## 3356 SIMMONDS, N. W.

**A survey of the Cavendish group of bananas.**

Trop. Agriculture, Trin. 1954 : 31 : 126-30.

The survey provides information on the identity and synonymy of the five varieties constituting the Cavendish group, viz. Extra-dwarf Cavendish, Dwarf Cavendish, Giant Cavendish, Robusta and Lacatan.

## 3357 COSMO, I. &amp; POLSINELLI, M.

Orientamento per i futuri impianti viticoli nella zona collinare di Conegliano-Valdobbiadene in provincia di Treviso. (**Guide for future planting of vines in the hill zone of Conegliano-Valdobbiadene in the Treviso province**).

Agricoltura d. Venezia 1954 : 8 : 367-78.

Although the zone in question in northern Italy is one where white grapes are prevalent, tests have shown that certain red varieties also give good yields and lead to the production of wines of good quality. Among those recommended are Cabernet franc for growing alone, and Merlot, Barbera and Malbeck for mixing to produce a wine for immediate consumption. Among the white grapes a clonal selection of Prosecco is recommended as being purer and less apt to produce small sterile fruits than the original Prosecco; this, with possibly up to 10% of Riesling italico, is the only variety recommended for growing with Verdiso, the classical vine of the locality. Among the rootstocks, Berliandieri x Riparia 420 A is suggested for drier slopes, Kober 5 BB for moister ground and Rip.-Cord.-Rup. 106-8 for heavy ground low in lime content.

3358 BAŠIROV, F. B.

(**Viticulture in the Primorje**).

Vinodelie i Vinogradarstvo SSSR (Wine-mak. & Vitic. USSR) 1954 : No. 2 : 30-39. [Russian].

A description is given of Šasla Primorskii [Primorje Chasselas], which, like Alpha and Taežnyi Izumrud [Taiga Emerald], is distinguished by hardiness and perfect flowers. It shows resistance to fungi and yields 3-4 tons of grapes per ha. The grapes are pale green and have a muscat flavour.

3359 MARIMAN, G.

La viticulture septentrionale en plein air. Chronique de l'année 1953. (**Viticulture in the north in the open. Report for 1953**).

Courr. hort. 1954 : 6 : 124-29.

In addition to a report on Belgian vineyards in 1953, this article contains a survey based on L. Levadoux's monograph (cf. *PBA*, Vol. XXII, Abst. 1443) and dealing with the breeding and genetics of vines with special reference to hybridization and its technique.

3360 **New grape released.**

Amer. Nurseryman. 1954 : 99 : No. 6 : p. 44.

The variety Dix, a selection from the cross America x Bailey, has been released by the US Department of Agriculture and the New Jersey Agricultural Experiment Station. It grows vigorously, is moderately resistant to foliage diseases and matures at the same time as Concord. The fruit is of value for the quality of its juice which has a mild flavour and is deep red in colour.

3361 BRUNI, B.

Fioritura e fecondazione del genere "*Vitis*." (**Flowering and fertilization of the genus *Vitis***).

Riv. Vitic. 1954 : 7 : 43-44.

MANZONI, L.

Il sesso nelle viti da seme. (**Sex in vines from seed**).

Ibid. 1954 : 7 : 45-46.

Experiments are reported in which selfed seed from hermaphrodite plants gave rise to plants with hermaphrodite, female and male flowers in varying proportions according to the parent variety. This is thought to be in agreement with the view that the hermaphrodite forms have arisen by mutation from an originally dioecious species.

In his reply, L. Manzoni states that the majority of hermaphrodite individuals examined by him gave rise to hermaphrodite progeny, and refers briefly to the genetics of sex in vines.

3362 GOLODRIGA, P. JA.

(**The choice of pollinator varieties in vines**).

Agrobiologija (Agrobiology) 1953 : No. 5 : 105-10. [Russian].

Several of the best vine varieties of the southern shores of the Crimea suffer badly from fruit shedding and the production of small seedless fruits. Emasculated inflorescences of these varieties were pollinated (a) with pollen of several other varieties individually, (b) with mixed pollen of these varieties, and (c) with pollen from different plants of the same variety. The results were quite different from those to be expected from the behaviour of the pollen in artificial media, which only indicated the degree of viability of the pollen in question; the pollination experiments showed that certain varieties had cross-compatible pollen which stimulated fruit development and reduced shedding. Thus for the variety Sary-Pandas the best pollen was that of Muskat Belyi [White Muscat], for Saperavi that of Muskat Kaljjabskii and for Čauš that of Pizaga or Saperavi. Even with varieties with hermaphrodite flowers supplementary pollination with pollen from other plants of the same variety raised the yield.

3363 BORISOGLEBSKIĬ, A. D.

(**A true successor to I. V. Mičurin. Fiftieth anniversary of the birth of A. Ja. Kuzjmin**).

Vinodelie i Vinogradarstvo SSSR (Wine-mak. & Vitic. USSR) 1954 : No. 3 : p. 63. [Russian].

Mention is made of early varieties of vine with



perfect flowers that have been bred by Kuzjmin at Mičurinsk. Tambovskii Rozovyĭ [Pink Tambov], from Malingre Seedling x 135, and Tambovskii Zelenyi [Green Tambov], from Čauš x Early Malingre, mature between 20 and 25 August. Nagrada [Reward], from Russian Concord x Ezandari Belyi [White Ezandari], matures a week later.

3364 MILOVANOV, L. V.

**(Chemical characteristics of dessert varieties of grapes in the Uzbek SSR).** Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 53–58. [Russian].

The ancient grape varieties of Central Asia are characterized by a relatively low content of cellulose, tannins, ash, nitrogen and acid and a high content of pectins; in the early-maturing varieties the sugars consist predominantly of glucose and their flavour is rather insipid. Some of the varieties recently bred by the Institute of Plant Industry (VIR), such as Ranniĭ VIR [Early VIR], have roughly equal contents of fructose and glucose and much better flavour. In the main-season varieties, fructose predominates over glucose and the total sugar content is higher than in the European varieties; some of the recently bred varieties such as Pobeda [Victory] and Čaras Muskatnyi [Čaras Muscat] rank as excellent in quality. The late-maturing varieties, which include Nimrang and Muskat Uzbekskii [Uzbek Muscat], excel the European grapes in quality and are distinguished by high keeping and transporting capacity.

3365 DARNAI, E. & KOZMA, P.

Csemegeszlő termesztésünk fejlesztésének néhány irányelve. **(Guiding principles for developing the production of dessert grapes).**

Agrártudományi 1952 : 4 : 75–81.

Qualities desirable in dessert grapes are discussed with reference to varieties cultivated in Hungary. Csabagyöngye [Pearl of Csaba] is of value because of its early maturity. Szőlőkertek Királynője [Queen of the Vineyards] and Rosa Menna di Vacca mature early, have an attractive appearance and keep well. Kecskemét Virága [Flower of Kecskemét] has a high sugar content and good keeping properties.

Crosses between varieties from different proles have given hybrids combining the good quality of *orientalis* types with the climatic adaptability and higher yields of *pontica* or *occidentalis* types.

3366 MIHAĬLOVA, P. V.

**(Producing new varieties of vines with coloured juice).**

Agrobiologija (Agrobiology) 1954 : No. 2 : 131–35. [Russian].

The hybrids 59–6, 58–27, 59–34 and 60–6, which have perfect flowers and make good quality wine, are described. They bear larger bunches and bigger grapes than Petite Bouchée Seedling, from which they are derived, and have a bright juice similar to that of the latter variety.

3367 NEGRULJ, A. M., ŽURAVELJ, M. S. & KAC, JA. F.

**(Vine varieties for the republics of Central Asia).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 5–36. [Russian].

A large collection of vines comprising 272 varieties from the Central Asian republics of the USSR and a number from elsewhere has been investigated in different parts of the USSR. A general account is given of the vines grown in the Central Asian republics, and is followed by a description of a number of new varieties bred by the Central Asian Experimental Station of the Institute of Plant Industry; details are given of their origin, botanical and agricultural characteristics, yield, chemical composition, quality and mode of utilization. Similar descriptions are given for certain introduced varieties which are useful either as early-maturing dessert varieties, for producing sultanas and currants or for wine making, and the varieties recommended for different purposes and times of picking are tabulated.

3368 SYAMAL, N. B. & PATEL, G. I.

**A wild species of grape in India.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 228–30.

A wild species of grape found growing in the Colegaon forest in Bihar, India, is described. It resembles *Vitis latifolia* and has the same chromosome number,  $2n = 40$ . Good yields and high resistance to disease and insect pests are among its desirable characteristics.

3369 ŽURAVELJ, M. S.

**(Report of work on a study of the frost resistance of vine varieties in the collection of the Central Asian Station of the Institute of Plant Industry).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1953 : 30 : No. 1 : 37–52. [Russian].

Out of a collection of 226 vine varieties under

observation at Taškent only 39 remained free from frost damage after the winter of 1949. In those varieties which were partially damaged, the damage was greater in the buds towards the base of a branch than in those towards the tip. Varieties differ in the degree to which the secondary buds are able to replace the main bud when it is damaged by frost, this ability being highest in the European vines and in some recent hybrids produced in the USSR, e.g. Pamjatj Mičurina (Mičurin Memorial), a hybrid of Muscat d'Alexandrie x *Vitis amurensis*. The vines of the Turkmenian and Tadžik SSR proved to be the hardiest and those of Uzbek SSR the most susceptible. Some of the primitive wild vines from Kopet Dag and Tien Shan were relatively hardy; the hardiest of all were *V. riparia*, *V. rupestris* and *V. amurensis* and some of Mičurin's hybrids involving *V. amurensis*, such as Buitur, Černyj Sladkij [Black Sweet] and Severnyj Belyj [Northern White]. Varieties differed in the rate at which the vine matured, and this property was correlated with the degree of hardiness; the Central Asian vines were the latest to mature and the hardy varieties the earliest.

3370 BARRETT, H. C.

**A survey of black rot resistance of the foliage of wild grape species.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 319-22.

Species tested for susceptibility to *Guignardia bidwelli* at the University of Illinois were placed in the following order of decreasing resistance: *Vitis cinerea*, *V. rupestris*, *V. champini*, *V. rubra*, *V. bicolor*, *V. cordifolia*, *V. doaniana*, *V. longii*, *V. riparia* and *V. amurensis*.

**FORESTRY**

3371 LANGNER, W.

Die Entwicklung der Forstgenetik und Forstpflanzenzüchtung in Deutschland. (The development of forestry genetics and forest tree breeding in Germany). Z. Forstgen. Forstpflanz. 1954 : 3 : 55-60.

A historical survey of the development of forest-tree genetics and breeding, both in Germany and in other European countries, is presented. Present-day research is outlined and the principal experiment stations concerned with the breeding of forest trees are listed.

3372 JARLØV, H. C.

En forædlet bævreasp. (An improved aspen).

Nat. Verd., Kbh. 1954 : 38 : 126-27.

Growth increment measurements of diploid and

triploid seedlings of (i) the artificial hybrid *Populus tremuloides* x *P. tremula*, and (ii) *P. tremula* have been recorded by the Swedish Association for Forest Tree Breeding. Heterosis is evident in the hybrid, which is also more resistant to fungous diseases than *P. tremula*. The triploids are not so very much larger than the diploids, though they seem to be maintaining their superior growth, especially of latter years.

3373 LJUNGER, Å.

Primärympning och plusträdsurval av ek. (Primary grafting and the selection of plus trees of oak).

Svenska SkogsvFören. Tidskr. 1954 : 52 : 139-56.

Seed plantations are essential for the provision of experimental material from which improved races of oaks for afforestation may ultimately be obtained by selection. A method of grafting in use at the forestry research station at Ekebo in Sweden is described, with a table showing the results obtained with trees from different localities.

The criteria to be adopted in the choice of plus trees from which to obtain scions are considered in the course of a discussion of a survey of oak stands in various parts of Sweden.

Ultimately, the breeding material from indigenous oaks of Sweden should be supplemented by material from oak stands in Denmark and Holland, and possibly Germany, France and eastern Europe.

3374 MULLER, C. H.

Una nueva especie de *Quercus* de la Sierra Madre Occidental de México. (A new species of *Quercus* of the western Sierra Madre of Mexico).

An. Inst. Biol. Univ. Méx. 1953 : 24 : 273-77.

A new species of the subgenus *Lepidobalanus*, for which a new series has had to be created, has been named *Q. martinezi* and is described.

3375 MULLER, C. H.

A new species of *Quercus* in Arizona. Madroño, S. Francisco 1954 : 12 : 140-45.

A new species, *Q. ajoensis*, related to *Q. hinckleyi*, has been discovered in the Ajo mountains, Arizona. It appears to hybridize with *Q. turbinella* under natural conditions. Its restricted distribution is attributed to the general desiccation of the region since the last pluvial period.

3376 TSOONG, P. C.

A new *Acer* from China.

Kew Bull. 1954 : No. 1 : p. 83.

The new species *A. miaotense* from northwestern



China is described. It shows affinity with the Japanese species *A. miyabei*.

3377 PAULEY, S. S. & PERRY, T. O.

**Ecotypic variation of the photoperiodic response in *Populus*.**

J. Arnold Arbor. 1954 : 35 : 167-88.

Details of experiments which have revealed the importance of day length in influencing the annual termination of growth in field populations of *Populus* spp. in North America are presented (cf. *PBA*, Vol. XXIII, Abst. 1494). When grown under uniform conditions of day length near Boston, Mass., the clones derived from the ecotypic collections exhibited considerable intraspecific diversity in time of cessation of terminal growth. Adaptation, it is concluded, depends upon a genetic mechanism which controls the duration of the seasonal period of growth in relation to the length of the frost-free season, the photoperiod functioning as the timing device for this mechanism. Intraclonal differences in response to different day lengths under greenhouse conditions were observed. The data suggest that the number of genes involved in the photoperiodic reaction of *Populus* spp. is large. Temperature is the major factor controlling initiation of growth after winter dormancy. The significance of photoperiodic response in forest trees is discussed in relation to the problems of seed source and breeding.

3378 VERESIN, M. M.

**(Seed growing and multiplication of poplars.**

Les. Hoz. (Forestry) 1953 : No. 4 : 68-71. [Russian].

At the Voronezh Forestry Institute, open-pollinated trees of *Populus alba*, *P. canadensis* and *P. tremula* transmitted their specific characters to their progenies but extensive segregation was observed in *P. balsamifera* hybrids. Most artificial hybrids from a direct cross between *P. tremula* and *P. alba* resembled the female parent but surpassed it in vigour. The reciprocal cross gave the most vigorous hybrids, a few of which resembled *P. alba*, the majority being intermediate between the two parental forms. The  $F_1$  of *P. balsamifera* x *P. canadensis* showed extensive segregation in respect of vigour and habit, including some dwarf forms with narrow willow-shaped or broad cherry-shaped leaves. The  $F_1$  of *P. canadensis* x *P. suaveolens* + *P. balsamifera* showed great variability, especially in respect of leaf colour. Some hybrids with mauve-veined or purple-veined leaves are of interest as ornamentals.

3379 SAATÇIOĞLU, F.

**Die Bedeutung des Pappelholzes und über Anbauversuche mit raschwüchsigen Pappelbastarden in der Türkei. (The importance of poplar wood and on experiments in planting fast-growing poplar hybrids in Turkey).**

Schweiz. Z. Forstw. 1953 : 104 : 289-96.

The results of trials conducted over a three-year period at the Forestry Experiment Station, Büyükdere-Bahçeköy, and at the pulping station, Izmit, are given. The clone *Populus euramericana* IT214 ♀, an introduction from northern Italy, proved well adapted to the region, was resistant to a number of diseases, displayed a straight, upright growth and produced wood suitable for the manufacture of paper pulp. *P. euramericana* TR Sümer 1, a new hybrid found at Izmit and thought to be a natural hybrid between clones IT214 ♀ and IT154 ♂, is described. It displays vigorous growth and is superior to its putative parents in disease resistance and growth habit.

3380 BONDARENKO, N. I.

**(*Populus pyramidalis* and its new forms).**

Les. Hoz. (Forestry) 1953 : No. 4 : 72-76. [Russian].

In the Kiev province, hardy, vigorous and drought-resistant forms were obtained by crossing *P. pyramidalis* with *P. berolinensis*. Some of the hybrids resembled the female parent in habit and leaf shape, whilst others resembled the male parent.

3381 VOLKOV, O. V.

**(Hybridization of poplars).**

Lez. Hoz. (Forestry) 1953 : No. 6 : 48-50. [Russian].

Natural hybrids between *Populus tremula* and *P. alba* found in the Stalingrad province were resistant to fungi and yielded appreciably more timber than *P. tremula*. Mention is also made of *P. tremula* forms selected in the Kostroma province for their rapid growth and resistance to heart rot.

3382 DELLINGSHAUSEN, M. VON

**Der Anteil fremden Pollens bei der Befruchtung in einer Birkensamenplantage. (Vorläufige Mitteilung). (The proportion of foreign pollen in the fertilization of a birch seed plantation. (Preliminary communication)).**

Z. Forstgen. Forstpflanz. 1954 : 3 : 52-53.

The effect of pollen from an old plantation on fertilization in a recently planted group of birch

trees situated some 300 m. away was found to be negligible in an experiment conducted by the federal department of forestry at Wietze, Western Germany. Pollen traps showed that the amount of pollen present diminished rapidly up to a distance of 130 m.; beyond this point the decrease was much more gradual, up to a distance of 380 m. The direction of the wind played a considerable part in determining the pollen concentration at any one particular point on any specific day.

3383 PERSSON, A.

Plantagefrö av masurbjörk. (**Plantation seed of curly birch**).

Skogen 1954 : 41 : 160-61, 163.

A seed plantation has been successfully established in the Kristianstad province in Sweden from bottle grafts, raised at the Ekebo research station, from eight curly birches (masurbjörk) of various provenance and having well-developed brown figured wood (masurved).

Production of pistillate and staminate catkins has been satisfactory, though the former has predominated so far. Male flowering will probably increase gradually, though equality as regards sex cannot be expected. The hereditary constitution of the individual trees is one of the factors determining the type of flowering.

3384 EHRENBURG, C. E.

Almsjukan. Historik och åtgärder för framställning av mot sjukdomen resistent almar. (**Elm disease. History and measures for the production of elms resistant to the disease**).

Svenska SkogsvFören. Tidskr. 1954 : 52 : 35-41.

After an account of the incidence and investigation of elm disease (*Ophiostoma ulmi*) in the Netherlands and other countries, research in the Netherlands (cf. Absts. 662 and 663) and in the USA on breeding resistant types of elm is reviewed. According to recent information from the Netherlands, the best results so far have been obtained with (a) hybrids between different local races and forms of *Ulmus carpinifolia* and (b) offspring from crosses between *U. carpinifolia* and the Asiatic species *U. pumila* and *U. wallichiana*. An occasional *U. glabra* mother tree, though itself susceptible, has, in combination with *U. carpinifolia* and *U. pumila*, been found to produce fairly resistant progeny. The fact that slow-growing trees suffer less from attack by fungous disease than those that grow vigorously may possibly partly explain the good results from hybridization with Asiatic forms.

The breeding of resistant elms is now part of the research programme of the Genetics Division of the Swedish Forestry Research Institute, which has produced 25 hybrids from greenhouse crosses between *U. glabra* and *U. pumila* and has also acquired promising grafting material of the most promising selections and hybrids available at the Phytopathological Institute at Baarn in the Netherlands. The successful production in Sweden of poplar hybrids resistant to *Fusicladium radiosum* and rust and of larch hybrids resistant to canker is mentioned as an indication of the value of hybridization in this field of research.

3385 WENT, J. C.

**The Dutch elm disease.**

Tijdschr. PlZiekt. 1954 : 60 : 109-27.

The results of the selection and hybridization programme initiated in 1937 are recorded (cf. *PBA*, Vol. IX, Abst. 493). Two highly resistant types, *Ulmus carpinifolia* 'Christine Buisman' and *U. carpinifolia* 'Bea Schwarz,' have been discovered and crossed with susceptible forms to produce hybrids combining resistance to *Ophiostoma* with good growth habit.

3386 RUHKJAN, A. A.

(**A case of conversion of hornbeam into hazel, described by S. K. Karapetjan**).

Bot. Ž. (Bot. J.), Moscow 1953 : 38 : 885-91. [Russian].

The viewpoint expressed in the article referred to in *PBA*, Vol. XXIII, Abst. 1501, is described as fallacious. Evidence is presented that a hazel branch had been grafted on the hornbeam and one Esajan, who claims to have made the graft, is mentioned.

3387 ESAJAN, G. S.

(**New facts on a hazel originating from a hornbeam**).

Agrobiologija (Agrobiology) 1954 : No. 1 : 87-97. [Russian].

Further studies of the hornbeam bearing a branch of hazel (cf. *PBA*, Vol. XXIII, Abst. 1501) are stated to corroborate Karapetjan's explanation of the phenomenon by interspecific conversion (but cf. Abst. 3386).

3388 VAARTAJA, O.

**Photoperiodic ecotypes of trees.**

Canad. J. Bot. 1954 : 32 : 392-99.

In experiments at Helsinki, seedlings of *Pinus sylvestris* and *Alnus incana* raised from seed collected in two widely different latitudes in Finland were subjected to 24-hour and 10-hour photoperiods but otherwise optimum conditions for growth. With continuous light, seedlings of



either species from the northern latitude grew better than those from the more southern latitude; under short-day conditions this situation was reversed. It is suggested that this behaviour is attributable to the heritable adaptation of the parent trees to photoperiodic conditions at the different latitudes. The results obtained support the view that photoperiodic ecotypes exist within tree species.

**3389 Researches on essential oils of the Australian flora : 1953 : 3 : Pp. 20.**

McKern, H. H. G., Spies, M. C. & Willis, J. L. *Critical studies on variations in essential oil yield and composition within and between individual trees of various Eucalyptus species.* (pp. 7-14).

In a study of variation in *E. dives*, ketone content differed significantly according to leaf age but not leaf type. Individual trees of *E. australiana* and *E. macarthurii* differed in oil yield and composition, the latter species being the more variable; marked variation in oil yield was not necessarily associated with correspondingly large variation in composition. Standardized techniques for determining variation in oil yield and composition between trees and within a single tree have been devised; their application in selection and breeding and in studying the biogenesis of essential oils and seasonal effects is discussed.

Penfold, A. R., McKern, H. H. G. Willis, J. L. *Studies in the physiological forms of the Myrtaceae. Part VI. An examination of the progeny obtained from Eucalyptus citriodora Hook. Var. A.* (pp. 15-20).

A preliminary account of this investigation has already been summarized (cf. *PBA*, XXIII, Abst. 2999).

**3390 PRAVDIN, L. F. & NEKRASOV, V. I. (Natural grafts of coniferous trees).**  
Bot. Ž. (Bot. J.), Moscow 1953 : 38 : 874-78. [Russian].

SEVEROVA, A. I.  
(Artificial grafts of coniferous trees).  
Ibid. 1953 : 38 : 879-84. [Russian].

Observations of natural grafts between *Pinus sylvestris* and *P. sibirica* in the Urals and grafting experiments involving different species of pine or spruce and pine at Moscow conflict with Abotin-Pavlov's contention that inter-specific grafts between forest trees are impossible (cf. *PBA*, Vol. XXIII, Abst. 1506). His viewpoint, shared by Dmitriev *et al.*, that a species may evolve by conversion from another is rejected.

**3391 SUKAČEV, V. N. [EDITOR] (Editorial notice).**  
Bot. Ž. (Bot. J.), Moscow 1953 : 38 : p. 891. [Russian].

*Botaničeskii Žurnal* publishes a letter from Lysenko requesting the withdrawal from publication of an article criticizing Karapetjan's methods of investigating the case of the conversion of hornbeam into hazel (cf. Abst. 3386). Lysenko maintains that observations of the hornbeam tree have justified Karapetjan's viewpoint and that his article is scientifically sound. Lysenko mentions that he possesses new extensive information on the subject of conversions, of which he is making a detailed study. *Botaničeskii Žurnal* promises a review of the new material when it becomes available, adding that all reports dealing with conversions of woody plants so far have been explained either by natural or artificial grafting or by teratological changes due to a fungous disease.

**3392 RUBNER, K.**  
Zur Frage der Entstehung der alpinen Lärchenrassen. (On the question of the origin of the alpine larch races).  
Z. Forstgen. Forstpflanzenz. 1954 : 3 : 49-51.

It is suggested that the larch survived the last Ice Age in certain comparatively sheltered regions, mainly to the south of Lake Geneva and in eastern Austria, and later recolonized the alpine districts from these centres. Three ecotypes are distinguished, each being found at a different altitude, and their origin is traced back to the isolated populations of the Glacial period. The ecotype found in Styria and the southern confines of the Alps has developed in competition with other trees and natural selection has resulted in a straighter stem, more vigorous growth and a greater resistance to canker than is found in trees of the other two ecotypes, which grow at altitudes of above 1700 m. and between 800 and 1700 m., respectively.

**3393 JOHNSSON, H., KIELLANDER, C. L. & STEFANSSON, E.**  
Kottutveckling och fröbeskaffenhet hos ymträäd av tall. (Cone development and seed quality in grafted pines).  
Svenska SkogsvFören. Tidskr. 1953 : No. 4 : 358-73.

Observations at Ekebo, Sundmo and Stigsjö in Sweden have shown that grafted pines 6-8 years old may produce a considerable quantity of well-developed cones and seed with good germination capacity. To promote the production

of such seed, nurseries should be situated in a locality with a much better climate than that in which the mother trees grow. Other factors affecting cone and seed development in grafted trees are the nature of the soil, the genotype and the season.

3394 ORR-EWING, A. L.

**Inbreeding experiments with the Douglas fir (*Pseudotsuga taxifolia*, (Poir.) Britton).**

For. Chron. 1954 : 30 : 7-16.

Of the two trees studied at the University of British Columbia, one was much more self incompatible than the other. Cytological examination of material from the highly self-incompatible tree showed that the embryo aborted at an early stage after self pollination. The selfed progeny of this tree showed a significant reduction in height compared with seedlings resulting from wind pollination or controlled cross pollination of the same tree. A few viable seeds were obtained from unpollinated cones; they gave rise to diploid and very uniform seedlings. It is suggested that, provided the degree of self incompatibility is not high, selfing offers a useful means of evaluating the inherent qualities of individual trees of Douglas firs, since deleterious recessive characters quickly appear in the progeny.

3395 MAZEK-FIALLA, K.

**Die Steigerung der Harzerträge durch Selektion. (Increasing resin yields by selection).**

Allg. Forstztg. 1954 : 65 : p. 68.

It is claimed that the total surface area of the resin ducts is not a completely reliable guide to the resin-producing capacity of pines (cf. Abst. 1477). A more effective method of assessing potential yield is to measure the amount of resin exuded from a given cut surface over a fixed length of time. This procedure may be carried out on the needles or twigs of young trees, thus enabling high-yielding plants to be selected at an early stage.

3396 SCHÖNBACH, H.

**Beobachtungen an Einzelstamm-Nachkommenschaften "einheimischer" Douglasienbestände (Zugleich ein Beitrag zur Frage der natürlichen Formenmannigfaltigkeit der Douglasie). (Observations on the individual progeny of native Douglas fir stands; and also a contribution to the question of the natural diversity of forms in the Douglas fir).**

Arch. Forstwes. 1953 : 2 : 502-31.

A historical survey of the introduction of the Douglas fir into Germany is presented; natural selection has tended to eliminate unsuitable types and has led to the appearance of ecotypes adapted to mountainous or low-lying regions, respectively. Examination of three stands at Tharandt, Germany, showed that two distinct genotypes, differing in rate of growth, morphological characters and degree of resistance to frost, were present; this is attributed to the natural diversity of forms existing among the original seed introduced from North America, via Scotland, at the beginning of the nineteenth century. Breeding in Germany for increased resistance to early frosts is advocated; mass selection is considered the best means of achieving this end quickly.

3397 MINCKLER, L. S.

**Recent advances in the field of forest genetics.**

Trans. Ill. Acad. Sci. 1953 : 46 : 56-62.

The inheritance of morphological and physiological characteristics in forest trees is discussed. In trials of loblolly and short leaf pine in Illinois, trees of northern origin suffered less frost damage than those of southern origin. The progeny of crosses between loblolly and short leaf pine were undamaged by frost.

## VEGETABLES

3398 BOSWELL, V. R.

**Modern varieties of vegetables.**

Nat. hort. Mag. 1954 : 33 : 96-112.

After discussing, for the benefit of the non-commercial grower, a number of the present-day trends in vegetable breeding in the United States, the author comments upon the many old and new recommended varieties.

3399 TRÉBUCHET, G.

**Légumes hybrides. (Hybrid vegetables).**

Rev. hort., Paris 1954 : 126 : 1.064-65.

A short popular account of the commercial importance of hybrid vigour is given, with special reference to spinach, cabbage, onion and tomato.

3400 YARNELL, S. H.

**Cytogenetics of the vegetable crops. I. Monocotyledons.**

Bot. Rev. 1954 : 20 : 277-359.

Cytological and genetical investigations on the following are surveyed: sweet corn, asparagus, *Allium cepa*, *A. ascalonicum* x *A. fistulosum*, *A. schoenoprasum*, *A. porrum*, *A. sativum*, *A. fistulosum* and *A. fistulosum* x *A. cepa*. The bibliography contains 432 references.



- 3401 FERGUSON, W., LYALL, L. H. & JASMIN, J. J.  
**Varieties of merit in Canadian vegetable trials in 1953** : Pp. 7.

The best varieties in trials of the following crops are described: maize, pepper, carrot, onion, cabbage, cauliflower, water melon, squash, tomato and snap bean.

- 3402 KRICKL, M.  
 Vordringliche Zuchtziele bei Karotten.  
**(Urgent aims in carrot breeding).**  
 Saatgutwirtschaft 1954 : 6 : 61-64.

In experiments at the Institute for Advanced Study and Research in Horticulture, Vienna, selection over six generations in the variety Nantes resulted in a considerable reduction in size of stele and in increased uniformity of root shape. It is claimed that the carrot has been neglected by the plant breeder for too long and that many features, including keeping quality, root colour and dry matter and carotene content, can be improved by selection.

- 3403 NICOLAISEN-SCUPIN, L.  
 Morphologische Feststellungen an einem Möhrensoriment. **(The ascertainment of morphological characters in a collection of carrots).**  
 Mitt. Versuchanst. Wein- u. Obstb. Klosterneuburg Gartenb. Schönbrunn 1954 : Ser. B : 4 : 62-70.

The ratio of cortex to stele was determined for eight varieties at Wehrda, Hesse, Germany. Amsterdamer Treib [Amsterdam Forcing] and Nantes had the smallest proportion of stele and Sudenburger displayed the greatest uniformity in colouring between cortex and stele. The eight varieties are classified according to these characters.

- 3404 HAGIYA, K.  
**(Some problems connected with the branching habit of bolted carrots and the technique of seed selection).**  
 J. hort. Ass. Japan 1954 : 22 : 230-34.

Three oriental and ten European varieties were compared in respect of erect or spreading habit after bolting, number of branches and bolting period. The oriental varieties bolted early, and bore erect inflorescences with few laterals. The European varieties bolted rather later, and bore frequently branched and spreading inflorescences.

- 3405 NICOLAISEN-SCUPIN, L. & NICOLAISEN, N.  
 Feststellungen über den Zuckergehalt an 6 Möhrensorimenten und dessen Verhalten während der Mietenlagerung. **(Findings on the sugar content of six carrot varieties and its behaviour during storage in clamps).**  
 Mitt. Versuchanst. Wein- u. Obstb. Klosterneuburg Gartenb. Schönbrunn 1954 : Ser. B : 4 : 104-11.

Of six varieties tested at Wehrda, Hesse, Germany, Rote Riesen [Red Giant] and Sudenburger had the highest sugar content when the carrots were examined immediately after harvesting; Sudenburger and Nantes contained the most sugar after storage in a clamp, whilst Rote Riesen lost its originally high sugar content under these conditions. The importance of breeding for high sugar content and good keeping quality is emphasized.

- 3406 GREEN, D. E. & HEWLETT, M. A.  
**Parsnip canker : selection of resistant stocks of parsnip.**  
 Nature, Lond. 1954 : 173 : 779-80.

Stocks showing little or no canker caused by *Streptomyces scabies* have been selected at the Royal Horticultural Society's Gardens, Wisley, England.

- 3407 KÜPPERS-SONNENBERG, G. A.  
 "Violet commun" oder "rose ordinaire": die früheste Topinambursorte.  
**("Common purple" or "ordinary pink": the earliest variety of Jerusalem artichoke).**  
 Saatgutwirtschaft 1954 : 6 : 67-68.

A history of the cultivation of *Helianthus tuberosus* in Europe since its introduction from Canada in 1600 is given and the origin of present-day varieties traced back to the form "common purple."

- 3408 LAVRUHIN, I.  
**(A valuable forage plant).**  
 Kolhoz. Proizvod. (Collect. Fm. Prod.) 1954 : No. 3 : p. 46. [Russian].

Several Jerusalem artichokes which proved productive and hardy at the Gorno-Altaijskaja research station are listed. They include Volžskaja 2 [Volga 2], obtained from an inter-specific cross between Jerusalem artichoke and sunflower.

- 3409 LANDI, R.  
 Cipolle ibride. **(Hybrid onions).**  
 Genet. agr. 1954 : 4 : 91-101.

The production of hybrid onions at the California

Agricultural Experiment Station by the use of male-sterile inbreds is described.

3410 MELETTI, P.

Reazioni citologiche indotte, in *Allium Cepa* L., da alcuni composti della serie salicilica. (Cytological reactions induced in *A. Cepa* L. by some compounds of the salicylic series).

Caryologia 1953 : 5 : 342-58.

Solutions of salicylic and acetylsalicylic acids applied in various concentrations to onion roots induced c-mitosis, often accompanied by mitoinhibition and, at higher concentrations, by toxic effects; a reduction in chromosome length was also frequent. No accumulation of pro-phases or reversion of mitotic phases was observed and it is concluded that mitoinhibition is a preprophase phenomenon; when the material was transferred to water normal division was resumed.

Solutions of p-aminosalicylic acid had similar effects but were more toxic.

3411 PETERSON, C. E. & FOSKETT, R. L.  
**Occurrence of pollen sterility in seed fields of Scott County Globe onions.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 443-48.

In studies at the Iowa Agricultural Experiment Station the number of male-sterile plants in the progeny of open-pollinated male-sterile parents indicated a simple mode of inheritance, involving a higher incidence of the *Ms* factor for fertility than found in Italian Red 13-53. A few plants were intermediate between the fertile and sterile types in the amount of viable pollen produced.

3412 **New hybrid onion announced by USDA.**

Seed World 1954 : 74 : No. 4 : p. 35.

Aristocrat, which has given yields 50% higher than Brigham Yellow Globe in trials in Ohio, has firm flesh and will keep until early March.

3413 BILLERI, G.

Osservazioni sul cariogramma di *Allium moschatum* L. (Liliaceae). [Observations on the caryogram of *A. moschatum* L. (Liliaceae)].

Caryologia 1954 : 6 : 45-51.

The number  $2n = 16$  is reported for material collected in the vicinity of Livorno; the idiogram is similar to that of *A. schoenoprasum* and other species in the section *Schoenoprasum*.

3414 YAMAURA, A.

**Genetical and cytological studies in *Allium*. I. Spontaneous and induced variations of chromosome number in the pollen grains of tetraploid *Allium odorum* L.**

Jap. J. Genet. 1953 : 28 : 205-10.

In untreated flowers and material subjected to abnormally high or low temperature, pollen grains with the aberrant chromosome numbers  $n = 9, 11-19, 31$  and  $32$  were found in *A. odorum* ( $n = 16$ ). Data on meiosis in normal pollen mother cells suggested that the species originated as an autotetraploid. A pair of satellited chromosomes were invariably observed during metaphase in the first division of pollen grains with a normal complement.

3415 PERLASCA, G.

"Sanare," nueva variedad de repollo creada en el Instituto Nacional de Agricultura. (Sanare, a new cabbage variety created at the National Institute of Agriculture).

Agron. trop., Venezuela 1953 : 3 : 63-65.

Cabbages grown from seed from the USA do not normally produce flowers or seed in Venezuela. About 0.5% of the heads of the variety Wisconsin All-season formed seed, however, and by repeated selection in the progeny it has been possible to produce a variety, named Sanare, which is adapted to localities varying from 450 to 1300 m. above sea level in Venezuela. It forms seed regularly at fairly high altitudes without the necessity of a cold period.

3416 LAUX, D.

Untersuchungen über Entwicklungseinfluss, Variabilität und Vererbung der Korngrösse bei *Brassica oleracea*. (The influence on development and the variability and inheritance of seed size in *B. oleracea*).

Landw. Fak. Univ. Bonn 1953 : Pp. 94. (Mimeographed).

This doctor's thesis is concerned primarily with the effect of seed size on the vegetative vigour and rate of growth of the young plant. A high positive correlation was established between size of seed and seedling vigour, the minimum seed size for normal seedling growth being only slightly below the average seed size of the sample as a whole. Size of seed was found to be determined largely by weather conditions and other environmental factors; differences in average size of seed between large populations grown under identical conditions indicated that seed size was an inherited character, but no



significant correlation between the seed size of individual mother plants and that of their progeny could be established. This lack of correlation may be due to the heterozygous nature of *B. oleracea* and it is suggested that vegetative propagation be used to create large populations of identical genetic constitution which could then be grown under different environmental conditions with a view to establishing the comparative influences of heredity and environment.

3417 OVČININ, N.

**(The local cabbage variety Vasiljevskaja).**

Sad i Ogorod (Gdn. & Veg. Gdn.) 1954 : No. 3 : 72-73. [Russian].

This land variety, cultivated in the Ivanovo province, shows resistance to drought, pests and diseases and yields 600-700 c. per ha.

3418 FUSS, F. *ET AL.*

Die Frostnacht vom 19. zum 20. Mai 1952 und ihre Auswirkungen auf gärtnerische Kulturpflanzen in Sachsen. (The frost night of 19-20 May 1952 and its effects on horticultural plants in Saxony).

Arch. Gartenb. 1954 : 2 : 9-68.

This report includes information on varietal differences noted in resistance to frost. Of the cabbages observed, Erstling appeared to possess a high degree of resistance to frost. Eisenkopf [Iron Head] among the savoy, Lecerf among the cauliflowers, Nichtschiessender [Non-bolting] and Rogglis Freiland [Rogglis Open Ground] among the kohlrabis, Mieke Schindler among the strawberries and Onsa among the peas also suffered little damage.

3419 WINSTEAD, N. N. & WALKER, J. C.

**Toxic metabolites of the pathogen in relation to *Fusarium* resistance.**

Phytopathology 1954 : 44 : 159-66.

Experiments on resistant and susceptible varieties of cabbage, radish and cotton led to the view that *F. oxysporum* f. *conglutinans* races 1 and 2 and *F. oxysporum* f. *vasinfectum* produce metabolites which possess a low molecular weight, and which have a specific effect on susceptible varieties, thus playing a role in the establishment of infection in such varieties.

3420 SIMARD, J. & SIMARD, T.

Une maladie du chou. Nouvelle pour le Québec. (A cabbage disease new for Quebec).

34 Rep. Quebec Soc. Prot. Pl. 1952 (1953) : 43-44.

A new disease, provisionally identified as yellows

caused by *Fusarium oxysporum* var. *conglutinans*, has attacked cabbage crops in Quebec province, Canada. Of eight varieties tested in 1952, Copenhagen Market appeared least susceptible.

3421 PERLASCA, G.

"Lara", nueva variedad de coliflor creada en el Instituto Nacional de Agricultura. (Lara, a new variety of cauliflower created at the National Institute of Agriculture).

Agron. trop., Venezuela 1953 : 3 : 67-68.

The variety Danish Giant, imported into Venezuela from the USA, formed good heads and some 2% of the plants also gave fertile seeds. Sib crosses were made among the resulting seedlings and after four generations of selection a new variety, named Lara, has been produced; it is much more uniform than the original Danish Giant and is giving good results in regions between 1350 and 1500 m. above sea level.

3422 SUBRAMANYAM, K. N.

**Inter-generic hybridization between *Brassica* and *Raphanus*.**

Curr. Sci. 1954 : 23 : p. 60.

The cross between the cauliflower (*B. oleracea*) and radish (*R. sativus*) was fairly successful only when the former acted as the male parent. The failure of the reciprocal cross was due to the inability of the radish pollen to penetrate the styles of the cauliflower.

3423 LODEWIJKS, N. C.

**"Snowdrift": a cauliflower variety for the Lowveld.**

Fmg in S. Afr. 1954 : 29 : 217-18.

Snowdrift, the original seed of which was imported from the United States, has given outstandingly good results under the sub-tropical conditions of the Transvaal lowveld.

3424 ANSTEY, T. H. & MOORE, J. F.

**Inheritance of glossy foliage and cream petals in green sprouting broccoli.**

J. Hered. 1954 : 45 : 39-41.

Single recessive genes, designated *gl* and *cr*, respectively, determine the mutant characters glossy foliage and cream-coloured petals, which arose spontaneously at the Western Washington Experiment Station.

3425 M., S.

**Chou de Bruxelles *Rubis rouge*. (The Red Ruby Brussels sprout).**

Rev. hort. suisse 1954 : 27 : 122-23.

Further data on this new variety are given (cf.

Abst. 2514). It is a tall, late-maturing variety and includes in its parentage the Dutch variety Roodnerv [Red Vein].

- 3426 MATUO [MATSUO], K. and MIZUNO, S.  
(Effects of microwave treatment on the sex ratio of plants. I. Spinach.)  
Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 201-02.  
[Japanese].

The effect of subjecting spinach seed soaked in water at 20° C for two days to microwaves was investigated. No marked effect on the sex ratio was discovered, but, in the case of large seeds, the ratio of morphologically-female male plants increased.

- 3427 JUNGES, W.  
Jarowisation von Spinat (*Spinacia oleracea* L.) und ihre "Nachwirkung" auf die folgende Generation. [Vernalization of spinach (*S. oleracea* L.) and its effect on the following generation].

Arch. Gartenb. 1954 : 2 : 1-8.

At the Horticultural Institute, Dresden-Pillnitz, Germany, vernalization of seeds of the variety Matador for five days at a temperature of between 0 and 5° C resulted in the adult plants flowering earlier and producing 6½ times as much seed, by weight, as the untreated control plants. This seed had a higher 1000 seed weight and produced plants of more vigorous growth than did the seeds of the control plants.

- 3428 WHITAKER, T. W. & MCCOLLUM, G. D.  
Shattering in lettuce—its inheritance and biological significance.  
Bull. Torrey bot. Cl. 1954 : 81 : 104-10.

The shattering character of *Lactuca serriola* is dependent upon a single dominant gene, non-shattering cultivated varieties of lettuce (*L. sativa*) being homozygous recessives for this factor. Shattering is not linked with achene colour or leaf lobing.

- 3429 MIGUEL, M. C. DE S. M. C.  
Identification of lettuce (*Lactuca sativa* L.) varieties on the basis of seed and young plant characteristics.  
Proc. int. Seed Test. Ass. 1953 : 18 : 180-88.

Varietal differences in the seeds and morphological characters of the young plant are described and a key to the classification of varieties according to these distinctions is provided.

- 3430 NELSON, R. & MOOAR, M.  
Comparative resistance to leaf blight diseases in some commercial varieties of celery in 1952 and 1953.  
Quart. Bull. Mich. agric. Exp. Sta. 1954 36 : 275-79.

The resistance of 28 varieties to *Cercospora apii* and *Septoria apii-graveolentis* is recorded. No varieties were immune. Florida Green Pascal, Emerson Pascal, Improved California Pascal, Earligreen and Michigan Golden showed most resistance.

- 3431 JURINA, O. V.  
(Combined cultivation of tomatoes and melons under screens).  
Sad i Ogorod (Gdn. & Veg. Gdn.) 1954 : 4 : 21-24. [Russian].

Of 129 varieties of melon tested at Gribovo, Rassadnaja 13 [Transplanting 13], Gribovo, Krasnodar 13-17, Gruntovaja Gribovskaja 149 [Outdoor Gribovo 149] and Tridcatidnevka [Thirty Days] gave the highest yields. In similar trials of 84 varieties of water melon, Dnepropetrovsk 1, Skorospelka Harjkovskaja [Harjkov Early], Skvirskii Skorospelyi [Early Skvir], Stokes and Gribovo 45 proved the most productive.

- 3432 GREBENŠČIKOV, I.  
Die Entwicklung der Melonensystematik (Ein Beitrag zur Systematik der Kulturpflanzen). [The development of the systematics of melons. (A contribution to the systematics of cultivated plants)].  
Ber Mitt. Inst. KulturpflForsch. Berlin 1953 : 1 : 121-38.

A history of the systematic classification and nomenclature of wild and cultivated varieties is given and Pangalo's classification (cf. *PBA*, Vol. VI, Abst. 292) subjected to a detailed and critical analysis. A revised key to melon classification is provided.

- 3433 SMITH, P. G. & VENKAT RAM, B. R.  
Interspecific hybridization between muskmelon and cucumber.  
J. Hered. 1954 : 45 : p. 24.

In crosses between musk melon and cucumber at the Department of Vegetable Crops of California University, Davis, fruits were set when hormone pastes were applied at the time of pollination, but the seeds contained no embryos (cf. *PBA*, Vol. XXIII, Abst. 3049).



3434 SCARCHUK, J.

**Storrs Green Hybrid summer squash. A new, early, productive  $F_1$  hybrid dark green summer squash.**

Storrs agric. Exp. Sta., Conn. 1953 : Pp. 7.

The above hybrid, obtained at Storrs Agricultural Experiment Station, Conn., is the  $F_1$  of Caserta x Salerno; it has given higher early and total yields than the varieties with which it was compared in tests. The fruits resemble those of Salerno.

3435 TAKASHIMA, S.

**(The percentage growth of the pollen tubes in interspecific hybrids of *Cucurbita*. I).**

Idengaku Zasshi/Jap. J. Genet. 1953 : 28 : 232-37. [Japanese].

Direct and reciprocal crosses were made involving all combinations of the three species *C. pepo*, *C. maxima* and *C. moschata*. Two varieties of each species were used. A table is given of the fruit set obtained in each cross. This ranged from 19.8% in *C. pepo* x *C. moschata* to 79.8% in *C. moschata* x *C. maxima*. The fruit set in any interspecific combination was liable to vary according to the particular varieties used.

3436 YAMANE, Y.

**Studies on species hybrids in the genus *Cucurbita* III.  $F_1$ -hybrids of *C. moschata* x *C. Pepo* with the special reference to varieties *Kogiku* (*C. moschata*) and *Sōmen* (*C. Pepo*).** Biol. J. Okayama Univ. 1953 : 1 : 202-08.

Of the 13 combinations attempted between varieties of the above two species, viable seeds were only obtained from the cross *Kogiku* x *Somen*. The  $F_1$  hybrids were successfully reared by means of a special germinating bed and by leaving the transplanted 45-day-old seedlings for 3 days in a dark room, before planting in the field. The adult plants exhibited hybrid vigour. Meiosis was usually regular, 20 bivalents being formed at metaphase I in the pollen mother cells. The pollen fertility of the  $F_1$  hybrids was 77.07%, compared with 84.65% in *Kogiku* and 89.08% in *Somen*.

3437 SAMOILENKO, M. D.

**(A hardy cucumber).**

Sad i Ogorod (Gdn. & Veg. Gdn.) 1954 : 4 : 69-70. [Russian].

Reference is made to a hardy variety of cucumber, obtained at Umanj by vegetative hybridization between cucumber and melon.

3438 SUN, S.-K. & CHIAN [CHIEN], H.-S.

**(The occurrence of downy mildew of the cucumber and experiments to control it).**

Nungyeh Yenchiu/Agric. Res., Taipei 1952 : 3 : No. 3 : 31-39. [Chinese].

All 36 varieties tested for resistance to *Peronosplasmopara cubensis* in southern Taiwan proved susceptible. Differences in degree of susceptibility existed, however, a local variety from Fengshan proving least susceptible.

3439 BARHAM, W. S.

**The inheritance of a bitter principle in cucumbers.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 441-42.

Crosses made at the North Carolina State College showed the bitter flavour of PEI 173889 to be due to a single dominant gene, designated *Bt*. This factor segregated independently of those governing resistance to downy mildew.

3440 WILSON, J. D., JOHN, C. A. & MYRICE, F. **Ohio MR25... a pickling cucumber highly tolerant to mosaic.**

Res. Circ. Ohio agric. Exp. Sta. 1954 : No. 25 : Pp. 8.

Ohio MR25 exhibits the pattern of mosaic resistance typical of Chinese Long, which develops mild chlorosis after infection and shows partial or nearly complete recovery. National, Tokyo Long Green, Vickery, Ohio 31, White Spine and Early Russian were involved in the complex pedigree of Ohio MR25, in addition to Chinese Long. The new variety has exhibited a higher degree of mosaic tolerance than Ohio MR17 (cf. *PBA*, Vol. XXII, Abst. 802).

3441 CHRISTIANSEN, E. & HENRIKSEN, A.

**Dyrkningsforsøg med stammer af asieagurker 1946-1950. (Cultivation trials with strains of large cucumbers for preserving, 1946-50).**

Tidsskr. Planteavl 1954 : 57 : 498-517.

This report has already been summarized from a résumé previously issued (cf. *PBA*, Vol. XXIII, Abst. 737).

3442 **A new dwarf tomato.**

New Hungary 1954 : No. 13 : p. 8.

A brief description of the tomato Kecskemet Dwarf, developed in Hungary from the cross Reziszta x Fortschritt [Progress], is given: The variety is said to be 7-12 inches high, each fruit weighing 1-2 oz.

- 3443 BLONDIN, P.  
Les variétés de tomates et leur amélioration. (**Tomato varieties and their improvement**).

Rev. hort. suisse 1954 : No. 5 : 156-57.

This summary of a meeting held at the Botanical Experiment Station of the University of Geneva, Switzerland, includes a brief account of tomato breeding at the station, where special attention is being paid to improving the variety Mendel.

- 3444 MANUNTA, C.  
Ricerche fisiogenetiche sul fattore tangerine (*t*) nella discendenza  $F_3$  di incroci fra diverse razze di *Lycopersicum esculentum*. [**Physiogenetic researches on the factor tangerine (*t*) in the  $F_3$  progeny of crosses between different varieties of *L. esculentum***].

Genet. agr. 1954 : 4 : 147-60.

The  $F_3$  of the cross Tangerine x Palla Oro (cf. *PBA*, Vol. XXIII, Abst. 3069) has now been studied; the progeny of an  $F_2$  plant with tangerine fruits with yellow skin segregated into plants with tangerine fruits of varying intensity and plants with yellow tangerine fruits, some with yellow skin and some with white. The  $F_2$  plant must therefore have been of the genotype *Rr<sub>tt</sub>* and the yellow tangerine type is shown to correspond to genotype *rr<sub>tt</sub>*. The content of polycopene in the tangerine fruits varied, being twice as high in some as in the  $F_2$ ; it thus seems that the quantity of polycopene produced in *tt* fruits is affected by the degree of homozygosity of the gene *R*. Some fruits of the tangerine type had a pink endocarp, which seems to be conditioned by a separate set of genes, possibly governing the formation of  $\zeta$  carotene, or even lycopene.

In an  $F_3$  of *L. pimpinellifolium* x Tangerine produced from an  $F_2$  plant with tangerine fruits all the fruits had tangerine flesh and yellow skin and the contents of  $\beta$  carotene, lycopene and polycopene were similar to those of the  $F_2$ .

- 3445 RICHARDSON, R. W. (JUN.) & CURRENCE, T. M.

**Genetic effects of reduced fertilization in tomato flowers.**

Proc. Amer. Soc. hort. Sci. 1953 : 62 : 449-58.

At the University of Minnesota the following conclusions were drawn from experiments designed to modify segregation by eliminating gametes with slow pollen-tube growth (cf. *PBA*, Vol. XXIII, Abst. 2254); (1) removal of styles

from emasculated flowers 24 hours after pollination reduced seed set and increased seed weight; (2) heavier seeds showed a higher percentage of germination; (3) the smallest seeds and seeds of flowers from which the styles had been removed 24 hours after pollination bore more elongate fruits; and (4) seeds from the proximal half of the fruit produced plants giving a higher early yield.

- 3446 HONMA, S.

**Comparison of recurrent parent with different backcross generations in tomato.**

Diss. Abstr. 1953 : 13 : Publ. No. 5353 : p. 618.

Experiments were undertaken to explore the possibility of transferring the following three recessive genes to Firesteel, without appreciably modifying this variety: *ps* for functional sterility, in chromosome I; *c* for potato leaf, in IV; and *a<sub>1</sub>* for green stem, in V. A selection from the  $F_3$  of the first cross and selections from each of the four back-cross generations were tested for their combining ability in crosses with four other varieties, in comparison with the combining ability of Firesteel and the nonrecurrent parent. In combining ability for yield characters, the  $F_3$  of the original cross was equal to Firesteel and superior to the other lines; back-crossing resulted in a decline in combining ability for yield. The recovery of the genotype of Firesteel with respect to fruit size occurred immediately in the back-cross programme. Suggestions are made concerning the genetic causes of this behaviour of yield and fruit size.

- 3447 RICK, C. M. & SMITH, P. G.  
**Novel variation in tomato species hybrids.**

Amer. Nat. 1953 : 87 : 359-73.

$F_2$  populations of hybrids of *Lycopersicon esculentum* with the self-incompatible species *L. peruvianum* and *L. chilense* included variants which did not fall within the normal range of variation. In the case of a plant with old-gold colour of the corolla and anthers, derived from *L. esculentum* x *L. chilense*, conclusive evidence was obtained that the variant depended on a major recessive factor (*og*), present in the heterozygous condition in the *L. chilense* parent. The gene pair *ogog* had the same phenotypic expression in a pure *L. chilense* background as in the  $F_2$  interspecific variant. Apparently each of three other variants, with an entire leaf, a highly compound inflorescence and dark pigmentation of the anther tubes, respectively, was also



caused by the homozygous condition of one or more recessive genes derived from *L. chilense* or *L. peruvianum*.

3448 BUTLER, L.

**Two new mutants in the tomato, propeller and rosette.**

J. Hered. 1954 : 45 : 25-27.

The X-ray-induced mutant rosette (*ro*) showed a deficiency in its monohybrid ratios, presumably as the result of reduced viability. The mutant termed propeller (*pr*), characterized by large persistent cotyledons and also induced by X irradiation, gave good monohybrid ratios. The factor *ro* belongs to linkage group I; *pr* was independent of genes in groups I, VII and VIII.

3449 GOLIŃSKA, J.

**Opis rozszczepiania się krzyżówki vegetatywnej pomidora czerwonego z żółtym. (A description of the segregation of a vegetative cross of a red tomato with a yellow).**

Roczn. Nauk rol. 1954 : 68 : Ser. A : 507-16.

In 1950 there was grafted on a plant of the variety Złota Królowa [Golden Queen] a scion from a seedling which had been obtained in 1949 from a previous grafting, in which a plant of the variety Humbert had been grafted on one ordinarily yielding yellow pear-shaped fruit, with the result that this scion produced red fruits of the Humbert type. Other similar graftings to that in 1950 were made, but only two of the grafted plants, designated No. 1 and No. 2, yielded fruit.

In 1951, seeds from No. 1 produced 141 plants, only one of which, No. 17, yielded fairly large fruits. In 1952, seeds from No. 17 gave 40 plants which are designated the  $F_2$  of the 1950 vegetative cross. They are described and the number of plants, each bearing only yellow, orange and red fruits, is given as 11, 15 and 14 respectively; this is the "segregation" referred to in the title. A table shows the incidence, amongst these 40 plants and their fruits, of numerous other morphological characteristics, e.g., plant height, shape, size and smoothness of fruit.

3450 MANUNTA, C.

**Ulteriori indagini sulla selezione dei pomodori ad alto contenuto in provitamina A e vitamina C. (Further investigations on the selection of tomatoes with high contents of provitamin A and vitamin C).**

Genet. agr. 1954 : 4 : 116-46.

Analyses of a number of tomato varieties from

Australia, Great Britain and Canada were made and the contents of  $\beta$  carotene, lycopene and vitamin C are reported for fruits grown in northern, central and southern Italy.

In the  $F_2$  of the cross Blood Orange x Palla Oro [Gold Ball], in which segregation for the genes *Rr* and *Yy* occurred, the plants possessing the *R* gene formed only traces of lycopene in the fruits, again suggesting that lycopene formation is controlled by a number of genes; the cross Blood Orange x Cuor di Bue [Ox Heart] also gave two  $F_2$  plants similar to Blood Orange in colour but inferior in lycopene content.

Some plants from the  $F_4$  of the cross Palla Oro x *Lycopersicon hirsutum* had higher content of  $\beta$  carotene and lycopene than the  $F_3$  plants (cf. *PBA*, Vol. XXIII, Abst. 3073) but the vitamin C content was somewhat low; otherwise the  $F_4$  generation resembled the  $F_3$ , all shades of red being present and the lycopene content varying from 1.56 to 10.4 mg. per 100 g.,  $\beta$  carotene from 0.23 to 3.51, and vitamin C from 14 to 38. In the  $F_4$  generation of Cuor di Bue x *L. hirsutum* several plants combined high contents of  $\beta$  carotene and vitamin C with a lycopene content equal to that of the common red varieties. Thus plant 13b VII bore intense orange-coloured fruits, with a  $\beta$  carotene content of 8.15, lycopene of 15.5 and vitamin C of 36 mg. per 100 g.; the vitamin content in this population varied from 8 to 54, the  $\beta$  carotene from 0.27 to 11.60 and the lycopene from 1.17 to 30.6. In the  $F_4$  of Comet x *L. hirsutum* the  $\beta$  carotene varied from 0.39 to 11.16, lycopene from 0.31 to 12.92 and vitamin C from 11 to 40 mg. per 100 g.; plant XIII<sub>4</sub> is mentioned as having 50 mg. of vitamin C, 5.1 mg. of  $\beta$  carotene and 4.30 mg. of lycopene per 100 g.; certain other plants are also mentioned as having favourable combinations of vitamin and pigments.

The observations on the  $F_4$  confirmed the previous conclusion that  $\beta$  carotene and lycopene synthesis are each conditioned by independent sets of multiple genes. No marked differences were noted in the results from the three different localities.

3451 PIQUER, G.

**Les plantes et les facteurs du climat. 8. Le thermopériodisme. (Plants and climatic factors. 8. Thermoperiodism).**

Bull. Hort., Liège 1954 : 9 : 163-67.

This survey of the literature on thermoperiodism includes information on varietal differences in nocturnal thermoperiod requirements in the tomato.

3452 BOLL, W. G.

**Studies on the growth of excised roots. IV. Investigations into the application of the technique of the culture of excised roots to comparisons between strains and hybrids of tomato.**

New Phytol. 1954 : 53 : 177-203.

Six excised-root clones, each derived from a seed of the same inbred plant of the variety Red River, displayed quantitative and qualitative differences in growth characteristics, when taken through 21 subcultures under standardized conditions. The possible nature of these differences is discussed.

3453 WARING, E. J.

**Tomato varieties for canning.**

Aust. Fd Mfr 1953 : 22 : No. 12 : 22, 26.

The advantages and disadvantages of the varieties used for canning in Australia are surveyed. Australian breeding projects to improve the quality of canning varieties are described. It is thought that the choice of initial material in breeding has been too narrowly restricted to the relatively uniform American types; Chinese varieties are believed to be a promising source for improving flesh characteristics and vigour. Brief consideration is also given to the possibilities of hybrid production.

3454 BIANCHI, A., FORLANI, R. & MANUNTA, C.

**Sul contenuto in zuccheri dei frutti di varie razze di pomodoro e di alcuni loro incroci. (The sugar content of various tomato varieties and of some crosses of them).**

Genet. agr. 1954 : 4 : 42-57.

The sugar content of ripe fruits of a number of tomato varieties varied roughly between 4% and 6%; values of over 6% were recorded for Palla Oro [Gold Ball] and Blood Orange among the varieties of *Lycopersicon esculentum* and 8.877% in *L. pimpinellifolium*; hybrids of this species with the variety S. Marzano, which had 4.602%, gave a mean value of 6.373% in the  $F_1$  and 6.624% in the  $F_2$ . The variation in the  $F_2$  did not reach either of the parental limits; there were 29 oblate fruits: 86 spherical and the sugar content of the former was 6.188% as compared with 6.814% in the latter, suggesting a linkage between the gene *o* for oblate fruits in S. Marzano and at least one gene for sugar content; the oblate fruits also had a higher average weight than the round. No significant correlation between fruit size and sugar content was observed within the fruits of a single plant.

3455 BIANCHI, A.

**Selezione di pomodoro con elevato contenuto in zuccheri nei frutti. (Tomato selection for high sugar content in the fruits).**

Genet. agr. 1954 : 4 : 58-67.

Data for the logarithms of the fruit weights in the tomato S. Marzano, *Lycopersicon pimpinellifolium* and their  $F_1$  and  $F_2$  hybrids (cf. Abst. 3454) suggest that 14-15 pairs of genes are concerned in conditioning fruit weight; the number determining sugar content is estimated at 4-5, and a negative correlation of 0.243 between fruit weight and sugar content was observed in the  $F_2$ , from which it is argued that at least 3 of the sugar-content genes are linked with genes for fruit weight; the linkage appears to be genic since no correlation was observed in the parent lines or the  $F_1$ . It is thought, however, that by choosing suitable cultivated varieties as parents and applying the back-cross method, it should be possible ultimately to produce a tomato with large fruits of improved sugar content.

3456 SCHAPER, P.

**Resistenzzüchtung bei Gemüse. (Breeding for resistance in vegetables).**  
Saatgutwirtschaft 1954 : 6 : 123-24.

Varieties and wild species of value in breeding for disease resistance are listed. In the cabbage, several old land races and Bindsachsener [Compact Saxon] carry genes for resistance to *Plasmodiophora*. In tomato breeding, *Lycopersicon hirsutum*, *L. peruvianum* and forms of *L. esculentum* provide potential sources of genetic resistance to *Phytophthora infestans*, whilst Vetomold, Improved Bay State and forms of *L. esculentum* and *L. pimpinellifolium* possess resistance to *Cladosporium fulvum*. Among forms resistant to *Fusarium* are Pan American, Riverside and *L. pimpinellifolium*.

3457 New Manalee tomato.

Seed World 1954 : 74 : No. 7 : p. 42.

Manalee, a new, early-maturing variety released by the Florida Gulf Coast Station, gives high yields and is resistant to *Fusarium* wilt, grey leaf spot, leaf mould and early blight. The medium-sized fruits ripen uniformly and are well adapted to modern harvesting and processing methods.

3458 BRASHER, E. P.

**Genetic differences in standard and in new tomato varieties.**

Trans. Peninsula hort. Soc. 1953 : 43 : 33-36.

Data on maturity, yield, quality and resistance



to *Fusarium* wilt are presented for 38 varieties tested at the Delaware Agricultural Experiment Station. Delaware 5, Homestead and Chesapeake were superior on soils infested with *Fusarium* wilt, whilst Stokescross 5, Delaware 4C, Delaware 5 and Improved Garden State were best on noninfested soils. Queens was the earliest maturing variety and was suitable as a fresh vegetable and for canning; Chesapeake matured latest.

3459 WATTS, V. M.

**A new tomato variety goes to seedsmen.**

Arkans. Fm Res. 1954 : 3 : No. 1 : p. 6. Indark, a variety adapted for cultivation in Arkansas and Indiana and similar in yield and maturity to Rutgers, has been released by the University of Arkansas. The fleshy fruits are spherical in shape, deep red in colour and comparatively free from cracking. Like the related variety Fortune, Indark is highly resistant to *Fusarium* wilt.

3460 PERSSON, A. R. & Bremer, A. H.  
Gransking i frilandstomat. (**Research on outdoor tomatoes**).

Forskn. Fors. Landbr. 1953 : 4 : 229-63. Investigations, carried out by the Institute of Vegetable Crops of the Agricultural College of Norway, on the possibility of outdoor cultivation of tomatoes in Norway have involved trials of 53 Norwegian and other varieties. Satisfactory yields were obtained from Bonner Beste [Bonny Best], Dansk export [Danish Export] and Earliana, but Toftø P44, a strain of Bonner Beste, surpassed Dansk export. NF's Tidlig Busk [NF's Early Bush] was the earliest bush variety and it and Lav Busk [Low Bush] are mentioned as promising, but the former has too small fruits for commercial purposes.

The research programme also includes investigations on (a) varietal differences in the reaction to growth substance treatment as compared with hand pollination as a means of promoting fruit setting, and (b) preliminary investigations on the possible economic value of heterosis in tomatoes. In the latter experiments, yield, quality and fruit weight differed greatly according to the locality of the test. Bonner Beste outyielded the F<sub>1</sub> hybrid from its cross with Dansk export, but the hybrid was superior in quality.

3461 MESSEDAGLIA, L.

Per la storia delle nostre piante alimentari. La melanzana. (**The history of our food plants. The egg plant**). Ann. Accad. Agric. Torino 1951-52 : 94 : 119-34.

Etymological and historical notes are presented in which it is shown that the egg plant (*Solanum melongena*) was cultivated by the Arabs in Spain from the eighth century and was known in Italy in the thirteenth; there is no evidence for an American origin as supposed by certain authors.

3462 TJUTIN, M. G.

(***Solanum muricatum***).

Priroda (Nature) 1954 : No. 3 : 91-92. [Russian].

Mention is made of new forms of *S. muricatum*, developed at Suhumi from material introduced from South America. Some bear apple-shaped and others plum-shaped fruits.

3463 LAŠUK, G. I.

(**An experiment on directing changes in the inheritance of a plant organism**).

Agrobiologija (Agrobiology) 1954 : No. 2 : 54-64. [Russian].

Changes in the short-day habit of *Hibiscus abelmoschus* were induced at the Nikita Botanical Garden by (1) constant exposure to light and (2) vegetative and sexual hybridization with *H. esculentus* and *H. manihot*. The mentor effects of *H. esculentus* and *H. manihot* upon *H. abelmoschus* were greater when the hybrids *H. abelmoschus* x *H. esculentus* and *H. abelmoschus* x *H. manihot* were used and their F<sub>1</sub> and F<sub>2</sub> backcrossed to their respective paternal parents.

3464 IVANOV, N. P.

(**Complex study of the collection of leguminous crops**).

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 61-66. [Russian].

The many valuable additions to the world collection of legumes at the Institute of Plant Industry, Leningrad, include a very early, dwarf, white-seeded haricot bean resistant to anthracnose from Latvia; a large-seeded runner bean Lopata [Shovel]; almost sweet varieties of *Lupinus albus* suitable for fodder; Dobrudžanka, an extremely early-maturing soya bean with small seeds; chickpeas resistant to *Ascochyta*; very early, hardy, small-seeded broad beans from the highlands of Svanetia; and nematode-resistant forms of *Vigna* and soya bean.

Pollination of peas without previous emasculation gave 87-95% of hybrids.

Studies of the protein in various species have shown that the seeds of phylogenetically young genera such as *Phaseolus* and *Glycine* contain mainly water-soluble proteins, whereas lupins and other members of the oldest tribe Genisteae

contain few water-soluble and mainly salt-soluble proteins; members of the tribe Viceae are intermediate in this respect. Marked varietal differences have been observed in respect of the content of nutritionally important aminoacids such as lysine, cystine and tryptophane in the seeds and of citric acid in the leaves.

- 3465 SCHAPER, P.  
Resistenzzüchtung bei Gemüse. (**Breeding for resistance in vegetables**).  
Saatzgutwirtschaft 1954 : 6 : 97-98.

A short popular account of breeding for disease resistance in the French bean and the pea is given. The pathogens attacking these two crops are indicated and sources of resistance to diseases in the French bean both from wild varieties and strains in the world collection are described.

- 3466 **Bean rust.**  
Agric. Gaz. NSW 1954 : 65 : Pt. 2 : p. 101.  
The brown-seeded Kentucky Wonder is the only variety of bean resistant to all the physiological races of *Uromyces phaseoli* occurring in Australia.

- 3467 SVENSSON, V.  
Weibulls Stella II, ny kokbönsort.  
(**Weibull's Stella II, a new variety of cooking bean**).  
Weibulls ill. Årsb. 1954 : 49 : 32-34.

This variety was bred at Weibullsholm Plant Breeding Institute from a natural cross between Weibull's Stella and a mottled horse-bean. In comparative trials in 1950-53, Stella II exceeded Stella in yield and 1000 seed weight by 11.8% and 10% respectively; it also surpassed Beka and Ahle in both these respects. Though, in the unfavourable year 1952, it ripened one day later than Stella and Ahle, it was 13 days earlier than Beka.

Trials at Alnarp and Nyckeby and in Kalmar have shown similar promising results.

- 3468 FIKRY, M. A. & LOTFY, T.  
**Studies on the structure of chromosomes of *Vicia faba* L. A further attempt to identify them separately.**  
Pakist. J. Sci. 1953 : 5 : 139-41.

On the basis of observations on the Swedish variety Getinge Small-seeded at the University of Alexandria, the chromosomes of *V. faba* are divided into two main groups: (1) chromosome I, with a length more than double the average length of the other chromosomes, a submedian centromere, secondary constriction and large satellite; and (2) chromosomes II-VI, with a subterminal centromere and a very short arm. Group (2) is further subdivided as follows: (a)

chromosomes II-IV, with the short arm as wide as the long arm, and (b) chromosomes V and VI with the short arm narrower than the long arm. It is postulated that chromosome I originated as the result of fusion of two chromosomes.

- 3469 GROMOVA, V. A.  
(**Extending French beans into more northerly regions**).  
Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 91-93. [Russian].

A collection of 238 French beans was examined in the vicinity of Leningrad and those which formed ripe seed every year are indicated, some of them being classed as resistant or partially resistant to anthracnose. Other varieties are mentioned as giving high yields of green pods or of green seeds, and some, such as Mexico 3839, as giving good yields of both pods and seeds.

- 3470 NICOLAISEN, N.  
Unsere Gemüse-Hochzuchten. (**Our pedigree varieties of vegetables**).  
Saatzgutwirtschaft 1954 : 6 : p. 64.

Data on quality, disease resistance and morphological and agronomic characters are presented for the main varieties of runner bean cultivated in Bavaria (cf. Abst. 2551).

- 3471 DACOSTA, G. C.  
**Factors causing varietal differences in germination of the common bean (*Phaseolus vulgaris*).**  
Diss. Abstr. 1954 : 14 : Publ. No. 6564 : 1-2.

Experiments on the effects of several internal and external factors upon germination and subsequent behaviour led to the general conclusion that varietal differences in germination, emergence and field stand depend upon a number of factors acting singly or in combination. It is stated that "the influence of selection on emergence of field-planted beans was shown."

- 3472 JOUBERT, T. G. LA G.  
**Hard-skin in beans.**  
Fmg in S. Afr. 1954 : 29 : 225, 232,

The poor germination recently observed in seeds of single-plant selections of the runner-bean variety Savage at the Pretoria Horticultural Research Station was found to be due to hard skin, 90% of the beans showing this defect. Seed of other varieties and breeding material remained unaffected, suggesting that hard skin is heritable. Storage of the beans at low humidity is regarded as the chief factor causing the expression of the tendency of the skins to harden.



- 3473 PAVLOVA, A. M.  
**(Varieties of *Phaseolus aureus* for new regions of irrigated agriculture).**  
 Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 67-70. [Russian].

A collection comprising 670 specimens is being investigated by the Institute of Plant Industry, Leningrad. Those from western China are regarded as the most useful for breeding as they have large, light-coloured seeds, are relatively early and give good yields; two selections from them, Pobeda 104 [Victory 104] and VIR 628 [Institute of Plant Industry 628] are described, together with a hybrid, Gibrinyi 4 [Hybrid 4], produced from a cross of Pobeda 104 x Specimen 606. The highest yields were obtained from Pobeda 104, which in 1949 gave 18 c. per ha.; it has large green seeds of good cooking quality and a protein content of 28-31% and ripens early. VIR 628 bears its lowest pods high on the stem and is thus suitable for mechanized harvesting; it has small black seeds with a protein content of 28-33% and is relatively early. Hybrid 4 has large, long, light-yellow seeds with a protein content of 28-30%.

- 3474 ZAUMEYER, W. J.  
**Snap bean breeding studies of the United States Department of Agriculture.**

Seed World 1954 : 74 : No. 8 : 38-40.

Progress made in breeding for disease resistance in snap beans and other types of beans is discussed; the diseases referred to are the common, southern and yellow bean mosaics, halo blight and downy mildew. Breeding for nematode resistance in the Lima bean is also mentioned; promising Thorogreen and Fordhook 242 types tolerant of the pest have been developed.

- 3475 ZAUMEYER, W. J.  
**Snap bean breeding studies of the United States Department of Agriculture.**

Seed World 1954 : 74 : No. 7 : 36, 47.

Breeding for disease resistance is briefly discussed and the advantage of trials by seed growers prior to the final selection of a variety is emphasized. Selection of lines for resistance to mosaic from the cross Topcrop x Tenderpod is nearly completed. Other lines being developed yield well and possess resistance to three mosaic diseases.

- 3476 MOORE, J. F. & ALLMENDINGER, D. F.  
**Blue Lake pole beans in Western Washington. Varietal, plant- and row-spacing, and growth regulating materials studies.**  
 Bull. Wash. agric. Exp. Sta. 1954 : No. 548 : Pp. 17.

The results of trials of pole-bean varieties and breeding lines at Puyallup and Vancouver during 1950-53 are reported. Of the lines tested, FM1, USDA2006, USDA2053 and Stringless 92 showed some promise.

- 3477 ALLARD, R. W.  
**Inheritance of four morphological characters in lima beans.**  
 Hilgardia 1953 : 22 : 383-89.

The following gene pairs have been found: *Dd*, for indeterminate *vs.* determinate habit of growth; *Vv*, for variegated *vs.* nonvariegated leaflets; *Wewe*, for lanceolate *vs.* ovate leaflets; and *Crcr*, for normal *vs.* crinkled leaflets. The heterozygous genotype *Wlwl* is associated with ovate-lanceolate leaflets. Indeterminate habit, ovate leaflets and variegated leaflets are regarded as primitive characters. The mutation of *D* and *Wl* to the recessive condition is apparently of rare occurrence. Like the other three characters, crinkled leaf is much more frequent in wild and native-cultivated strains than in modern horticultural varieties; possibly this higher frequency may be ascribed to segregation since in regions where the Lima bean is indigenous cross pollination often occurs. The crinkled-leaf form is largely or entirely sterile as the result of concomitant floral abnormalities.

- 3478 ALLARD, R. W.  
**Inheritance of some seed-coat colors and patterns in lima beans.**  
 Hilgardia 1953 : 22 : 167-77.

The effects of five gene pairs for seed coat are described. The factor pair *Cc* determines red *vs.* white seed-coat colour, and also behaves as a basic gene for pigmentation of the hypocotyl and flowers and for the production of other colours of the seed coat. In the presence of *C*, *R* is responsible for dark red seed coats and for red hypocotyls, whereas *P* results in purple seed coat, hypocotyl and flowers. The genotype *CRP* is associated with black seed coat, red-purple hypocotyl and purple flowers. The pair *Ss* or *SS* alters red, dark red, purple or black seed coat to red, dark red, purple or black mottling on a buff background, respectively; *Ss* gives a diffuse type of mottling, *SS* a restricted type. The pair *Srsr* modifies the background colour

associated with the locus *S*, and is expressed only in the presence of *SS* or *Ss*; the dominant allele *Sr* conditions a buff background but *srsr* causes a red background. Variability among the individuals in all the colour groups studied indicated the existence of some less effective genes for seed-coat colour than *C*, *R*, *P*, *S* and *Sr*.

- 3479 KATO, I. & SAKAGUCHI, S.  
(Morphological and physiological studies on the mechanism of the occurrence of aborted seeds in the soya bean. III. The morphology, frequency, position in the pod, time of appearance and mechanism of occurrence of aborted seeds).  
Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 273-75.  
[Japanese].

Two causes of seed abortion are described, namely (1) failure of fertilization, and (2) collapse of the embryo. Failure of fertilization is more liable to affect the basal ovule. Collapse of the embryo is most frequent at either the proembryonic stage, or later when the water content of the embryo drops sharply.

- 3480 ENKEN, V. B. & MITJUKEVIČ, M. A.  
(Classification of soya bean seeds).  
Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 71-90. [Russian].

Soya beans differ in respect of colour of seed coat and hilum, pattern of seed coat, size and shape of seed, and shininess of seed surface; a key is presented for the identification of varieties on the basis of these characters, and indications are given of the plant characteristics that are usually associated with particular types of seed.

- 3481 YAMADA, T. & HORIUCHI, S.  
(Studies on the occurrence and mechanism of nongenetic variation due to competition. II. Modification in phenotypic development due to competition between individuals from different soya bean varieties and its mechanism).  
Ikushugaku Zasshi/Jap. J. Breeding 1953 : 3 : 9-16. [Japanese].

A comparative study of morphological and chemical characteristics of the two varieties Chakotsubu and Akidaizu [Large Autumn Bean], when grown separately or interplanted, is reported. The existence of intervarietal competition was shown by the fact that the

intervarietal differences in a number of characters were more pronounced in the mixed plantings than between the pure stands. The characters affected included such characters as top growth, dry weight and nitrogen assimilation. In the early stages of development, Chakotsubu grew at the expense of Akidaizu, but after the former began to flower, the situation reversed, since Akidaizu continued vegetative growth for another month.

- 3482 OZAKI, K.  
(Studies on the sensitivity of the soya bean to temperature and light. II. The relation between the varietal sensitivity of the soya bean to temperature and light, on the one hand, and differences in the principal characteristics of the soya bean resulting from various environments produced by cultivation, on the other).  
Hokkaido Nogyo Shikenjo Iho/Res. Bull. Hokkaido Nat. Agric. Exp. Sta. 1953 : No. 65 : 52-64. [Japanese].

Experiments are reported in which 25 varieties were compared for reaction to (1) interplanting with spring wheat, (2) different planting dates. It was discovered that there was a strong negative correlation between sensitivity to light and reduction in yield due to interplanting with wheat; light-sensitive varieties are therefore recommended for interplanting. In the second experiment, it was noted that late planting diminished the yield of light-sensitive varieties, while having little effect on other varieties.

- 3483 Soybean disease builds up.  
Agric. Res., Wash. 1954 : 2 : No. 12 : 12-13.

The soya bean variety Lee (S-100 x CNS), recommended for the southern region of the United States, is highly resistant to bacterial pustule, wildfire, frogeye and purple seed stain, moderately resistant to target spot and more tolerant of root-knot nematode than the majority of varieties. Older varieties resistant to one or more diseases are mentioned and future aims in breeding for resistance to the chief diseases are briefly indicated.

- 3484 OSLER, R. D. & WOODWORTH, C. M.  
The Clark soybean for Illinois.  
Bull. Ill. agric. Exp. Sta. 1953 : No. 569 : Pp. 4.

The purple-flowering variety Clark (cf. Abst. 751), selected from the back cross Lincoln x (Lincoln x Richland), has given good results in trials in Illinois. The plants were comparatively



resistant to lodging and the seeds had a higher oil content than those of other varieties tested.

- 3485 ATKINS, J. G. (JUN.) & LEWIS, W. D.  
**Rhizoctonia aerial blight of soybeans in Louisiana.**

Phytopathology 1954 : 44 : 215-18.

A detailed account of the occurrence and pathogenicity of *Pellicularia filamentosa* is given; Acadian, Roanoke, Improved Pelican and N46-2881 have proved moderately resistant.

- 3486 SATO, I. & NISHIKAWA, M.  
**(One of the causes of defective fruit setting in the soya bean).**  
Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 269-70. [Japanese].

Two insect pests, *Nezara antennata* and *Riptortus clavata*, have recently been responsible for serious damage to the pods of Japanese soya beans. Late varieties are less affected than early kinds.

- 3487 NISHIJIMA, Y. & KUROSAWA, T.  
**(On the influence of various factors on the degree of damage to soya bean seeds caused by *Grapholita glycinivorella*).**  
Hokkaido Nogyo Shikenjo Iho/Res. Bull. Hokkaido Nat. Agric. Exp. Sta. 1953 : No. 65 : 42-51. [Japanese].

A comparative study of the behaviour of the above pest on five Japanese varieties is presented. Hairy pods are less infested than glabrous. Varietal differences were noted in the incidence of larval death in the pod; it is suspected that the larvae die through the effect of some antibiotic substance. The varieties also differed in their ability to tolerate the pest and continue growth in spite of its ravages.

- 3488 LAMPRECHT, H.  
**The genes *Am* and *Aw* for flower colour of *Pisum* and their linkage.**  
Agri hort. genet., Landskrona 1954 : 12 : 38-49.

A critical survey of the literature on the genes *Am* and *Aw* is given. Crosses conducted at the Weibullsholm plant breeding station, Sweden, between De Haan's line carrying the factor *am* and Wellensiek's line possessing the factor *aw* (cf. *PBA*, Vol. XIX, Abst. 1435) have shown these two genes to be identical. A combination of *Am* and *Ap* is responsible for purple flower colour; in a recessive state, *am* tends to suppress this character, gives the testa an orange tinge and lighter pigmentation, and also leads to a reduction of plant vigour. *Am* was shown to be located in chromosome I; the order of genes

along this chromosome is now postulated as being *A-Vi<sup>1</sup>-Lf-D-Pur-Am-Sp-O-Red-I*. Considerable variation in cross-over values between *Am* and *I*, varying from 9 to 48.2%, was established in different crosses.

- 3489 LAMPRECHT, H.  
Selektive Befruchtung im Lichte des Verhaltens interspezifischer Gene in Linien und Kreuzungen. (**Selective fertilization in the light of the behaviour of interspecific genes in lines and crosses**).  
Agri hort. genet., Landskrona 1954 : 12 : 1-37.

A survey of the effects of interspecific genes in peas is given; closely related species may differ from each other only in respect of the alleles of a single pair of interspecific genes, which create a sterility barrier between the species concerned.

The recessive interspecific mutant genes *uni*, *lac* and *obo* were studied. Plants possessing any one of these alleles in a recessive state are completely sterile, display leaf and, in the case of *uni*, floral aberrations, and suffer from stunted growth. Segregation data obtained from crosses involving the gene pairs *Uni uni*, *Lac lac* and *Obo obo* indicated that there was a deficiency of *uni* and *lac* plants and an excess of *obo* plants in comparison with the 3 : 1 ratio of dominant to recessive which was expected. This is attributed to selective fertilization resulting from differential chemical attractions between the ovum and the different male nuclei.

- 3490 VASILEVA, O. A.  
**(Cytological and embryological investigation of multiparental pollination in peas).**  
Izv. Akad. Nauk SSSR (News Acad. Sci. USSR) 1954 : No. 2 : Ser. Biol. : 49-73. [Russian].

In Leningrad, some varieties were pollinated or supplementarily pollinated with large or restricted amounts of self pollen, foreign pollen or mixed pollen. In most experiments the maternal plants were emasculated, but in some the anthers were left intact. The foreign pollen was taken from *Vicia*, *Phaseolus* and *Lupinus*, besides some other varieties of peas. Cytological and embryological analyses showed that many pollen tubes penetrated each embryo sac, some reaching it before fertilization and others 6-8 days after fertilization when the embryo and endosperm had already shown some development. The zygote, embryo and endosperm showed a higher content of ribonucleic and

deoxyribonucleic acids than the unfertilized ovule. The isoelectric point also changed after fertilization. As the cell nucleus ages, its deoxyribonucleic acid content increases. This is regarded as evidence that the age of the gametes affects vigour, dominance of heritable characters and sex inheritance. Cytochemical analyses showed that the inner integument had a higher ribonucleic acid content and was formed of physiologically younger tissues than the outer integument and other ovary tissues. Pollination with a large amount of self pollen, foreign pollen or mixed pollen accelerated the growth of pollen tubes and caused more pollen tubes to reach the embryo sac, thereby intensifying the physiological processes accompanying fertilization. As a result, the embryo and endosperm developed more rapidly and the seed was more viable. The effects of supplementary pollination with self pollen, foreign pollen or mixed pollen upon development of the embryo and endosperm and seed viability were the same as those of pollination with large amounts of pollen.

- 3491 HÄNSEL, H.  
Vergleich der Konstanz verschiedener "Blühzeit"-Masse im Langtag in Hinblick auf Sortencharakteristik und Erbversuch bei *Pisum sativum*. (**Comparison of the constancy of different flowering periods in long day with reference to varietal characteristics and heredity experiments in *P. sativum***).  
Züchter 1954 : 24 : 77-92.

The influence of different temperatures and photoperiods on the growth, number of sterile nodes and flowering time of the day-neutral variety Vinco and the long-day varieties Unica and Parel was determined in the course of six experiments conducted at Wageningen, Netherlands, in 1949, at Cambridge, England, in 1950, and at Vienna, Austria, in 1951-52. The statistical data obtained indicate that these environmental factors sometimes considerably modify the genetically determined flowering time of pea varieties. Early-flowering varieties with few internodes would appear to be day neutral, while late-flowering varieties react to short photoperiods with a reduction in the ability to flower and by producing numerous sterile nodes. The possibility of breeding day-neutral late-flowering varieties is discussed and the importance to the breeder of taking varying environmental factors into account when comparing the flowering period of one generation of a line with its parent plants or progeny is stressed.

- 3492 KIFFMANN, R.  
Samen- und Hülsenmorphologie der zugelassenen westdeutschen Erbsenzuchtsorten und die Abartensystematik der gemeinen Kulturerbse (*Pisum sativum* L.). [**Morphology of the seeds and pods of authorized West German pedigree pea varieties and the systematic classification of varieties of the common cultivated pea (*P. sativum* L.)**].  
Z. PflBau 1954 : 5 : 49-76.

Data on colour, size and texture of the seed and hilum and on size, form and texture of the pod are given for all varieties of pea included in the official Federal German collection. A proposed classification of the different varieties on the basis of the above characters is outlined.

- 3493 LAMPRECHT, H.  
Ein neues Gen für Teilfarbigkeit von *Pisum*-Samen und seine Koppelung. (**A new gene for partial colouring in *Pisum* seeds and its linkage**).  
Agri hort. genet., Landskrona 1954 : 12 : 58-64.

The recessive gene *ve*, responsible for a new colour pattern in the *furca* type of *Pisum*, is described (cf. *PBA*, Vol. XVIII, Abst. 2572). It is characterized by absence of pigmentation in the area around the hilum and on both sides of the radicle. The appearance of *ve* is dependent upon both the basic genes for seed coat colouring, *z* and *mp*, being recessive and on the other genes for partial colouring, *Dem*, *Cal* and *Lob*, being dominant. In crosses, *ve* was found to segregate in the ratio 1 : 2 : 1; in a heterozygous condition it gives rise to a new type, *expandere*, intermediate between the *ventriosus* and the *furca* forms. Study of crossing-over led to the conclusion that *ve* is situated on chromosome II.

- 3494 LAMPRECHT, H.  
**The inheritance of the orange-coloured radicle and corona of *Pisum***.  
Agri hort. genet., Landskrona 1954 : 12 : 50-57.

A survey of previous literature on the genes *Gl* and *Cor*, responsible when in a recessive state for an orange colouring of the corona and of the seed coat covering the radicle, respectively, is given. The possibility of *cor* being a third allele of *Gl* was investigated by means of the cross *gl Cor i b* x *Gl cor I b*; it was found to be an independent gene. *Cor* and *Gl* were shown to be situated on chromosomes I and III,



respectively. The genes *Cor* and *I* had a cross-over value of 29%.

**3495 SCHEIBE, A.**

Die phänophasisch bedingte Typenresistenz der Erbsensorten gegen den Erbsenwickler (*Grapholitha nigricana* Steph., = *Laspeyresia* [Cydia] *nigricana* Steph.). [The phenophasically determined resistance of types of pea varieties to the pea moth (*G. nigricana* Steph., = *L. [C.] nigricana* Steph.)].

Phytopath. Z. 1954 : 21 : 433-48.

Experiments at the Max-Planck Institute for Experimental Breeding, Germany, have shown that degree of susceptibility to the pea moth depends upon time of flowering and length of flowering period. Peas of the *fasciata* type, in which the flowers blossom almost simultaneously and the flowering period of the individual blossom is short (cf. *PBA*, Vol. XXI, Abst. 2422) are relatively immune to infestation, as are also varieties which flower either before or after the main migratory flight of the moth.

**3496 SINGH, H. B. & BHAGCHANDANI**

**Genetics of leaf mutations in gram (*Cicer arietinum* L.).**

Indian J. Genet. 1953 : 13 : 106-09.

Investigations at the Indian Agricultural Research Institute, New Delhi, have shown that normal pinnate leaf depends upon the presence of three dominant genes,  $S_{1V}$ ,  $T_{1V}$  and  $N_{1V}$  (cf. *PBA*, Vol. XVII, Abst. 1011). When present in the homozygous recessive condition, each of these genes is responsible for a specific mutant character: simple leaf ( $s_{1V}s_{1V}$ ), tiny leaf ( $t_{1V}t_{1V}$ ) and narrow leaf ( $n_{1V}n_{1V}$ ). The gene  $n_{1V}$  has a pleiotropic narrowing effect upon the leaflets and other organs.

**3497 MILOV, V. M.**

**(Quantitative and qualitative composition of the protein and its variation in seeds of chickpea).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 134-43. [Russian].

In an examination of the seeds of 38 representative varieties of *Cicer arietinum*, protein contents varying from 22-37% to 31-63% were recorded, the mean being 26-37%; the variation was conditioned both by variety and environmental factors and the varieties also differed in their degree of response to the various factors. The varieties also varied in respect of the fractions of the protein which were extractable in water, salt and alkali and in the amount of lysine and

other aminoacids in the protein; thus the lysine fraction amounted to 2.24% in Azerbaidžan 583 and to 5.36% in Hybrid 27; these properties were, however, also influenced by environmental factors.

**3498 KOLJADKO, G. JA.**

**(The lentil in the Leningrad region).**

Trud. priklad. Bot. Genet. Selekc. (Bull. appl. Bot. Gen. Pl.-Breed.) 1952 : 29 : No. 3 : 94-98. [Russian].

Seed was collected in 1946 from a lentil growing in a field of spring vetch, and its multiplication in succeeding years gave rise to a small-seeded fodder lentil which has been named Severnaja [Northern]. The plant is erect and bears no pods below 20 cm. from ground level; it has borne seed every year, at an average rate of 13 c. per ha., the protein content of the seed being 30.7%.

A large-seeded cooking lentil, also bearing its pods at a height of over 20 cm. from the ground, has been selected and named Slavjanka [Slav]; it ripens seed regularly and has given an average yield of 15 c. per ha., with a protein content of 31.0%.

**3499 DAS, K.**

**A study of B-type chromosomes from root tips of two varieties of sweet corn.**

J. sci. Res. Banaras Univ. 1952-53 : 3 : 114-18.

The open-pollinated variety Black Mexican contained one to four B chromosomes; two of the four inbreds from Golden Bantam examined had one B chromosome each. This type of chromosome was characterized by its club shape, peripheral position on the somatic metaphase plate, deeper staining than the chromosomes of the normal complement and by an apparently terminal centromere.

**3500 JACKSON, A. A.**

**Hybrid sweet corn at Wye.**

Agriculture, Lond. 1954 : 61 : 77-79.

The technique found suitable at Wye College, England, for the production of commercial seed of the top cross known as Canada Cross or John Innes Hybrid (Canada Gold x an inbred line) is described.

**3501 HASKELL, G.**

**Adaptation of sweet corn to English climatic, edaphic and biotic factors.**

Plant & Soil 1954 : 5 : 170-81.

The author gives particular attention to cold tolerance and seedling blight, to insect pests and to damage by other animals, stressing that adaptation and also resistance to diseases and

insects depend basically on physiological reactions to new conditions of temperature, day length and light intensity. The influence of genotype upon resistance to some of the adverse factors is discussed in relation to the modification of its influence by the environment. Methods of genetical and nongenetical control of diseases and pests are indicated.

3502 LAUGHNAN, J. R.

**What's ahead for sweet corn?**

Canner 1954 : 118 : No. 10 : 15-17.

A popular account is given of breeding in progress at the Department of Botany, University of Illinois, to develop sweet corn superior in sugar content to present types by making use of the shrunken-2 gene (cf Abst. 1084).

3503 STEINER, M. & HOCHHAUSEN, I.

Parallele Veränderungen von Blattform und Chemismus bei somatischen Mutationen von *Mentha*. (**Parallel changes in leaf form and chemistry in somatic mutations of *Mentha***).

Züchter 1954 : 24 : 47-48.

The chemical composition of leaves taken from shoots of *M. crispa* that had reverted to a smooth-leaved form similar to *M. spicata* was compared with that of normal pubescent leaves on the same plant. It was established that the mutant leaves lacked the carvone found in normal leaves but contained menthol. It is inferred that both leaf type and chemical composition of the leaf depend on pleiotropic genes and that neither carvone nor menthol are formed until their precursors have entered the leaf.

3504 INOUE, H. & CHAMURA, S.

(**Studies on crossing peppermint. I. Some prerequisites for fruit setting**).

Nihon Sakumotsugaku Kai Kiji (Proc. Crop Sci. Soc. Japan) 1953 : 21 : 309-10. [Japanese].

Peppermint, in Japan, is autogamous and

entomophilous. Pollination is only effective for one day after anthesis. Seed setting was seriously reduced by exposing the inflorescences to 50° C for one hour.

3505 INOUE, H. & CHAMURA, S.

(**Studies on crossing peppermint. II. The lethal effect of high temperature on insect pollinators and two methods of emasculation**).

Nihon Sakumotsugaku Kai Kiji (Proc. Crop. Sci. Soc. Japan) 1953 : 21 : 311-12. [Japanese].

High temperatures and dryness both adversely affect insect pollinators; the pollinating insect most resistant to these conditions was *Scolia tokioensis*. Emasculation can either be done by hand around 9 a.m. or by hot water treatment at 47° C for five minutes.

3506 LIMA, A. R. & MOLLAN, T. R. M.

Nova variedade de *Mentha arvensis*. (**New variety of *Mentha arvensis***).  
Bragantia 1952 : 12 : 277-84.

Seedlings from plants of *M. arvensis*, introduced originally from Japan and acclimatized in the state of São Paulo in Brazil, showed wide segregation in morphological characters and in various physiological and agricultural features. One selection, MA701, was distinguished by hardiness, rust resistance and high yield of essential oils; it has produced 186 kg. of oil per ha., 35% more than selection MA3, which was itself considered 20-30% better than the common strain. The new variety is more tolerant of drought than the common strain and, though not immune to *Puccinia menthae*, is less severely attacked than most other strains. The oil from MA701 has a higher content of menthol and menthone and less esters than that of the common strain and is therefore classed as higher in quality.

## BOOK REVIEWS

BUTTRESS, F. A.

**World list of abbreviations.**

Leonard Hill Ltd., London 1954 : 18s. : Pp. ix + 261.

In the words of the introduction; "we live in an era of abbreviations, a literary disease for which the only cure is extirpation. Such a course is not likely and therefore the only relief is diagnosis without cure." This list is a comprehensive diagnosis of the general malady,

providing a key to over 2500 abbreviations of the titles of scientific and various other organizations. Confronted by such strange truncations as APES, ASSET, BAA, FEZ, FIG, GIOM, ICES, PIB, UNSCOB or ZWO, the bewildered reader will no longer be at a loss but be able to seek comforting enlightenment in the pages of this list. Foreign abbreviations have been translated and in most cases postal addresses are given. The guide is admittedly incomplete



and according to the introduction notice of omissions would be welcomed for future use. Information officers, librarians and all those whose work brings them into touch with the world's scientific, industrial and technical organizations will be grateful for the help of this list and will realize that compilation of a complete list would indeed be an impossible task, since there is no limit to the spawning of abbreviations of the names of organizations, whether large or small, wide or highly specialized in activities and interests. With its generous typography the guide is pleasant to use.

PATTERSON, A. M.

**A French-English dictionary for chemists.**

John Wiley & Sons, Inc., New York & Chapman & Hall, Ltd., London 1954 : 2nd. Ed. : 52s. : Pp. xiv + 476.

This revised edition of Patterson's well known French technical dictionary, originally published in 1921, has been enlarged to include many new scientific terms that have since become current and now contains an estimated 42,000 words. The chemical nomenclature has also been revised to accord with the most recent international decisions. Unlike many chemical dictionaries, this work includes a considerable general vocabulary, in addition to terms relating to physics, botany, biology, pharmacy and other branches of pure or applied science. The introduction gives general advice on how the book is to be used, and deals with questions of nomenclature and grammatical pitfalls. Some space might have been saved, and we hope the price of 52s. somewhat reduced, by omitting the repetition of adverbs such as *intermoléculairement* after the corresponding adjective. The work, however, appears to have been carefully prepared and may be recommended without hesitation.

DAVIES, O. L. (Editor).

**The design and analysis of industrial experiments.**

Oliver & Boyd, London 1954 : 63s. : Pp. xiii + 636 : figs. : tables.

There was a time when industrial experimenters learnt about statistical methods and efficient designs from books written specifically for the use of agriculturists and plant breeders. Methods have developed to such an extent, however, that books on industrial experimentation are appearing in their own right. This one is comprehensive, authoritative and interesting. Many of the usual chapter headings, such as Randomised Blocks and Latin Squares, and

Factorial Experiments, will be found; but the plant breeder will now benefit in his turn from the exceedingly complete presentation, especially in the nature of significance tests in their complete generality (the subject matter of Chapter 2), and from the more mathematical chapter appendices which explain the bases of many of the more advanced calculations. Sequential tests of significance, a modern form of test which may yet find a use in agriculture, are set out in full detail, and the book incorporates its own reference tables for use in the various tests, together with a glossary of technical terms. J. W.

SCHRADER, F.

**Mitosis. The movements of chromosomes in cell division.**

Columbia University Press, New York & Oxford University Press, London 1953 : 2nd Ed. : 25s. : Pp. xii + 170 : 19 figs.

The first edition of this treatise, reviewed in *PBA*, Vol. XV, p. 180, appeared in 1944. In the second edition, Prof. Schrader makes some attempt at the difficult task of catching up with the discoveries, theories and technical advances of the past ten years. As in the earlier edition, he bases his monograph mainly on mitotic studies of animal cells. New material has been added throughout but particularly in the chapter on Hypotheses of mitosis. Although still wisely refraining from making a synthesis of the diverse mechanisms postulated as responsible for mitotic activity, the author now goes a step further in his cautious concluding remarks, summarizing some well-established cytological findings which he suggests must not be overlooked in the many-sided physiochemical approach to the elucidation of mitosis. Cytologists will find the monograph valuable not only as a reference book in the ordinary sense but also for its broad grasp of essentials and purposeful emphasis on gaps in present knowledge.

ARNON, D. I. & MACHLIS, L. (Editors)  
**Annual review of plant physiology. Volume 5.**

Annual Reviews, Inc. 1954 : \$7.00 : Pp. ix + 399 : figs. : tables : illus.

The fifth volume of this useful series (cf. *PBA*, Vol. XXIII, p. 661) maintains the high standard set by previous issues. The present volume comprises fourteen contributions, of which one, Physiological aspects of fungus diseases of plants, by P. J. Allen, is directly concerned with problems facing most plant breeders and gives



a useful outline of the many factors which may influence the host/parasite relationship. Others that will be, directly or indirectly, of interest to plant geneticists are: Mechanism of action of micronutrient elements in enzyme systems by W. D. McElroy and A. Nason; Localization of enzymes in the cells of higher plants by D. R. Goddard and H. A. Stafford; The physiology of plant tumors by A. C. Braun; Postharvest physiology of fruits and vegetables by W. T. Pentzer and P. H. Heinze; Physiological aspects of fungus diseases of plants by P. J. Allen; and Occurrence, formation, and inactivation of auxins by S. A. Gordon.

Some authors note that "no attempt has been made to survey the Russian literature," for various reasons, which we fully appreciate and understand. We would nevertheless submit that the Reviews would be still more useful if, at least occasionally, they were to include contributions devoted to just these rather inaccessible sources of information, the value of which is so particularly difficult to assess.

GRAY, E.

**Microbiology. An introduction.**

Crosby Lockwood & Son, Ltd., London 1954 : 10s. 6d. : Pp. x + 175 : 25 figs.

This short, unpretentious textbook is intended only as a very elementary introduction to the wide field of microbiology and primarily for readers who have little or no previous biological knowledge. Its plan follows that adopted by the author, who is chief bacteriologist to Bayer's Biological Institute, Exning, Suffolk, England, during several years' teaching microbiology to classes of laboratory assistants and others generally interested in the subject. The first three of his eleven chapters give an account of the biology of microorganisms, their culture and control, and host-parasite relationships. The next four deal with the major groups of microorganisms: the viruses, bacteria, "yeasts, moulds and fungi" (a misleading title), algae and protozoa. Chapter 9 provides an introduction to soil microbiology, Chapter 10 an account of the microbiology of inland and marine waters, and the concluding chapter descriptions of some examples of applied microbiology. The author has packed a good deal of information into a small book, which should successfully give a beginner his bearings and encourage further study, aided by the short list of references of papers and more advanced books the author has added. Occasional lapses into an overdoing of the popular style, a chaotic use of italics and capital first letters for scientific terms, an unsatisfactory index and a sprinkling of

misprints will presumably not prevent this introduction from fulfilling its main purpose of instructing the beginner.

SMITH, G.

**An introduction to industrial mycology.**

Edward Arnold Ltd., London 1954 : 4th Ed. : 30s. : Pp. xiv + 378 : 161 figs. : 1 table.

The third edition of this by now well-established textbook appeared in 1946 and was reviewed in *PBA*, Vol. XVI, p. 373. The text of the fourth edition has been completely revised and much of it rewritten. A separate chapter on Nomenclature, an extension of a short section included in Chapter II in previous editions, has now been added, as well as an appendix on microscopy. The book is primarily intended for readers with little or no previous botanical training and for their benefit the new edition gives the etymology of Latin names of fungi and of technical terms. A few genera which were not included in previous editions and which have become more important in recent years are now described and illustrated. Twenty-two new illustrations have been added and six old photographs regarded as unsatisfactory have been replaced by better ones; a number of changes designed for convenience of reference have also been made in the layout. The author is to be congratulated upon the improvements he has made in an already good textbook.

PEIVE, J.

Techniskās kultūras. (**Industrial Plants**). Latvijas Valsts Izdevniecība, Rīga 1952 : Pp. 516 : 179 figs. : 211 tables.

Various aspects of cultivating flax, sugar beet and *Taraxacum kok saghyz* in Latvia and other parts of the Soviet Union are discussed with particular reference to modern agricultural methods. A wide field of subjects is covered for each of these plants. For instance, the section dealing with flax contains relevant information on all aspects of cultivation, harvesting and postharvest treatment and detailed notes on external conditions, soils and fertilizers, seed and stem analyses, vernalization, pests and diseases and their control. Descriptions of botanical varieties and forms, with special reference to cultivated varieties tested in the USSR, are given.

Similar detailed information is found in the sections on pages 284-404 dealing with sugar beet and on pages 405-510 dealing with *Taraxacum kok saghyz*.



The book is a useful manual for those interested in these industrial plants, but unfortunately its general value will be somewhat limited by the fact that it is written in Latvian.

FORLANI, R.

Il frumento. Aspetti genetici e agronomici del miglioramento della cultura granaria. (**Wheat. Genetical and agronomic aspects of the improvement of wheat growing**).

Tipografia del Libro, Pavia 1954 : L. 3000 : Pp. xv + 315 : 97 figs. : tables.

This book was originally planned as a joint monograph by R. Forlani and A. Oliva, the former contributing to the genetical and the latter the practical side. Unfortunately Oliva died before having completed his section and its place is taken by a final chapter on cultivation methods which Forlani had barely time to write between finishing his section and his untimely death in 1953.

Starting with a general botanical description of the wheat plant in its various phases of development, the author passes on to the systematics of the genus *Triticum* and a description of the species and their main varieties, with indications of synonymy; brief descriptions are also given of the related genera *Secale*, *Aegilops*, *Haynaldia* and *Agropyron*. The third chapter comprises a description of three ancient Italian wheats Rieti, Cologna Veneta and Gentilrosso, which have served as starting points for a large number of the modern varieties, the chief characteristics of which are presented in tabular form or in the form of summarized descriptions; these include certain forms of *T. durum*, *T. spelta*, *T. dicoccum* and *T. monococcum*. Chapter four is devoted to selection and crossing, the principles of which are stated clearly and illustrated by reference to the work of early breeders, including several, such as Todaro and Strampelli, in Italy; the main criteria in choosing parents and progeny, such as yielding ability, disease resistance, hardiness and standing capacity, are discussed separately. In discussing seed production some attention is given to the question of pure lines and a surprising number of authorities are quoted in support of the view that a certain degree of heterozygosity is an advantage; the author's own experiments on intravarietal crossing gave some slight indications of an increase in vigour, which declined in succeeding generations, but the results on the whole were not encouraging. Attempts to produce crossed seed by the method of open pollination described by Russian authors led

to a degree of cross fertilization varying from 3 to 45% in different varietal combinations. Intervarietal crosses gave somewhat more positive results than intravarietal and out of 25 combinations 19 gave a higher yield than either of the parents, and 6 were intermediate. The effects of other seed treatments such as "meridionalization," vernalization, irradiation and applications of colchicine and various hormones, are also dealt with briefly. The sixth chapter is devoted to interspecific and intergeneric hybridization, a field in which the author himself has made notable contributions. The various degrees of sterility are described and their causes discussed, mainly on the basis of the genome structure of the different species of *Triticum* and related genera. The main results of the various workers in this field are compared with those of the author, who also describes his results with the use of colchicine and other chemical agents in inducing polyploidy in some of the sterile hybrids, whereby he succeeded in producing several amphidiploids not previously known, such as *Aegilops ovata* x *Secale cereale*, *Ae. ovata* x *T. polonicum*, and *Ae. ovata* x *T. vulgare*. It is pointed out that many of these amphidiploids do not breed true since the parents had certain chromosomes or genomes in common, which makes segregation possible; great variation was observed also in vigour and fertility. In spite of the scant agricultural value of most of the hybrids so far obtained, the author expresses confidence that they will ultimately lead to material improvements in cereals, a view partially borne out by some of the later generations of his hybrids of wheat with *Ae. ovata*, which seem to be better adapted than Mentana to areas of low fertility or low rainfall. On the other hand, none of the derivatives of wheat x *Agropyron* crosses shows any promise either from an agricultural standpoint or as a possible perennial wheat.

The book is well documented and attractively presented, with a large number of illustrations, many of them reproduced from the author's previously published works. It contains a useful bibliography and a subject index.

RAMIAH, K.

#### **Rice breeding and genetics.**

Sci. Monogr. Indian Coun. agric. Res. 1953 : No. 19 : Rs. 17 As. 8 or 27s. : Pp. viii + 360 : 23 tables : 33 plates.

In this monograph information concerning research on rice breeding and genetics in pre-Partition India is brought together by an acknowledged expert on the subject. Although



dealing chiefly with Indian work, it refers to many of the genetical findings of investigators in other countries; the bibliography contains over 600 references. Several years have elapsed between completion of the survey and its publication. The foreword and preface were written in 1944, and the addendum to the latter is dated 1950. A sprinkling of references dated later than 1944 has been incorporated but their inclusion does not substantiate even the qualified claim made in the addendum that "the genetics of rice has been brought almost up to date," i.e. up to 1950. The survey can therefore only really be considered as covering the ground up to the end of the last decade, but as such it will be welcomed as an authoritative work conveniently collating a very considerable amount of information. By his former long association with research at the Paddy Breeding Station, Coimbatore, no one is better qualified than Mr. Ramiah to compile a monograph on this subject. His assistant, Mr. M. B. V. N. Rao, has also brought firsthand knowledge to the task, as Paddy Specialist of the Madras Department of Agriculture.

Part I, consisting of chapters I to VII, deals with the general topics of the history and origin of the crop, taxonomy of the genus *Oryza*, classification of cultivated varieties, botany of the rice plant, developmental studies, and procedures used in selection and hybridization. The next four chapters, comprising Part II, provide a detailed survey of Indian work on selection and hybridization. Part III, devoted to genetics, contains chapters on the following: anthocyanin pigmentation; inheritance of morphological characters; inheritance of physio-

logical and quantitative characters; correlations; linkage; mutations; and the cytology of cultivated rice and wild species. Chapter XIX considers the quality of rice from various aspects; in conclusion, Chapter XX discusses the different problems involved in raising rice yields in the Indian subcontinent. Appendix I provides, in tabular form, brief descriptions of all the improved strains produced at the different stations by the time of the compilation of the survey. Appendix II gives a revised scheme of gene symbols, as proposed by B. S. Kadam and the author. Appendix III consists of a glossary of vernacular names, and a laboratory method of determining the cooking value of rice is described in appendix IV.

## NEW JOURNAL

### *Die Kulturpflanze.*

The main object of this new East German journal is to publish an annual account of the work of the Institute for Research on Crop Plants, Gatersleben, which is affiliated to the German Academy of Sciences, Berlin. The first number includes an account on the aims of the institute (cf. Abst. 2764), an article on the influence of high-frequency electrostatic fields upon seed germination, papers on the systematics of melons (cf. Abst. 3432) and of crop plants in general (cf. Abst. 2779) and an index of plants grown at the institute and of which small quantities of seed may be had upon demand. Correspondence should be addressed to the Akademie-Verlag GmbH, Schiffbauerdamm 19, Berlin N W 7.